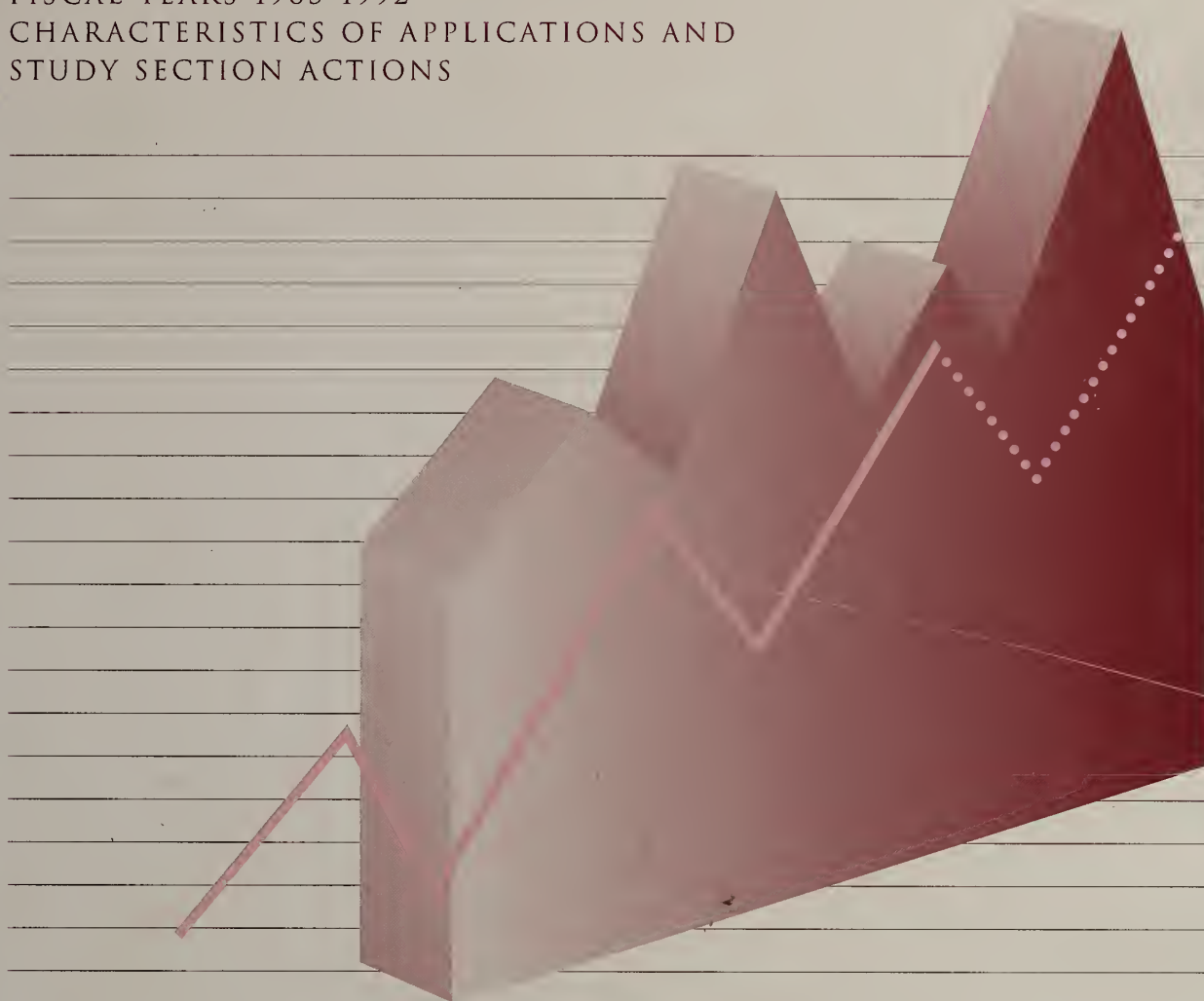


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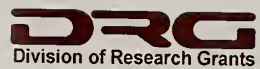
RG STUDY SECTION TRENDS

FISCAL YEARS 1983-1992
CHARACTERISTICS OF APPLICATIONS AND
STUDY SECTION ACTIONS

FY 83-92



NATIONAL INSTITUTES OF HEALTH
DIVISION OF RESEARCH GRANTS



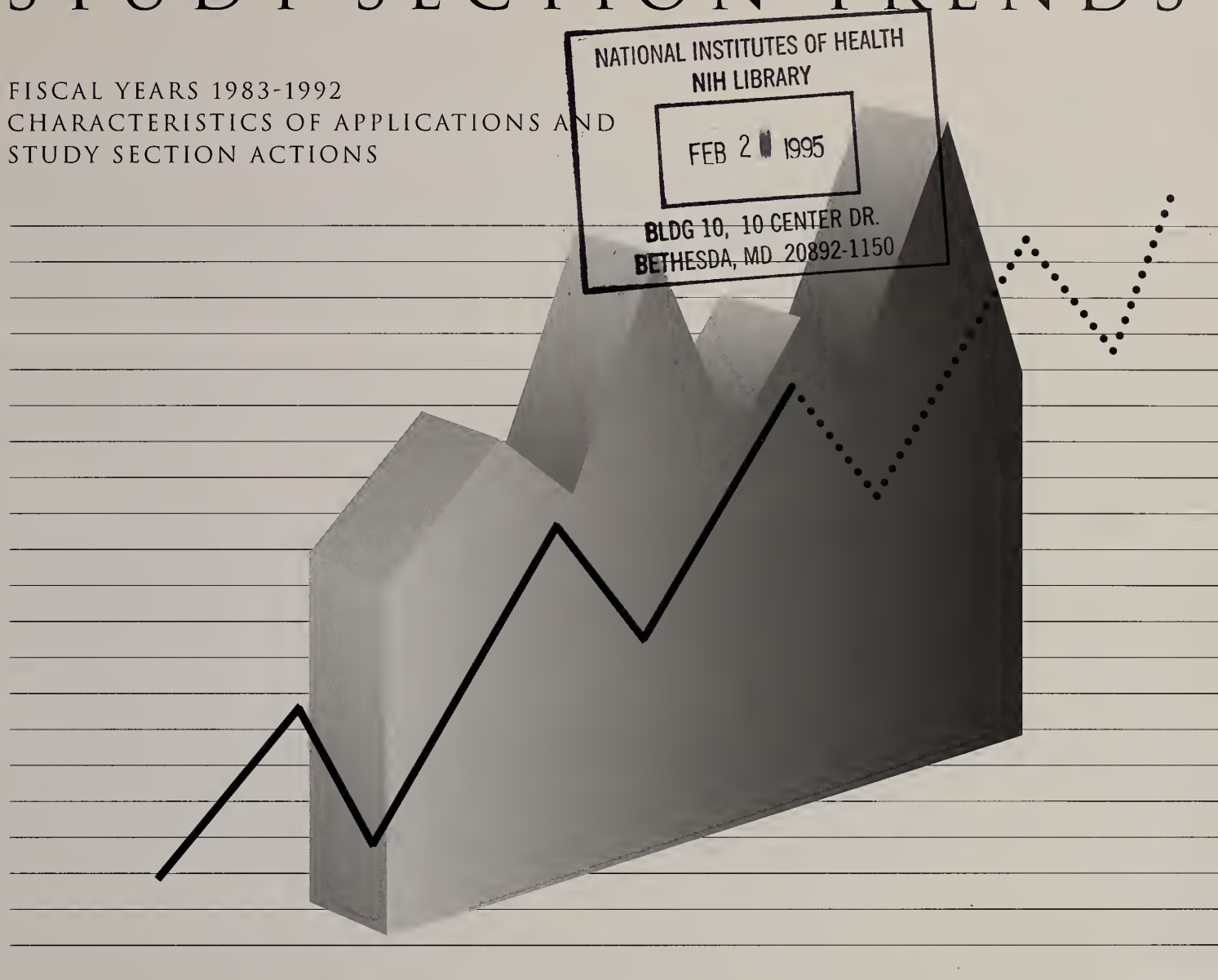
Prepared by the Statistics, Analysis and Evaluation Section
Information Systems Branch
Division of Research Grants
National Institutes of Health

DRG STUDY SECTION TRENDS

FISCAL YEARS 1983-1992

CHARACTERISTICS OF APPLICATIONS AND
STUDY SECTION ACTIONS

FY 83-92



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1983-1992

FOREWORD

This publication examines 10-year trends in the workload and actions of study sections, the initial review groups managed by the Division of Research Grants, in the context of an ever-changing research climate. It reports priority scores, percentile rankings, the final success of applications, and the characteristics of applicants and applications. Covering 1983 to 1992, this report includes trends resulting from recent NIH policy decisions, such as augmenting the duration of some kinds of grants and establishing new grant categories. While the initial part of the publication displays statistics on a variety of grant mechanisms, *its chief focus will be the traditional, investigator-initiated research project (R01) reviewed by DRG.*

The NIH system of peer review organizes panels of recognized experts to evaluate the merit of biomedical and behavioral science grant applications. The evaluations and priority ratings of these initial review groups are the most significant indices of the scientific merit of applications in the NIH review process. Subsequent versions of this volume will incorporate data for the National Institute on Alcohol Abuse and Alcoholism (NIAAA), the National Institute on Drug Abuse (NIDA), and the National Institute of Mental Health (NIMH).

The NIH peer review system adapts to changing conditions to provide a stable, yet flexible, system for the review of grant applications. A large number of applicants competing for a limited number of research grants subject both applicants and reviewers to pressure. In addition policy changes such as providing applicants with feedback, expanding the rating scale, or adopting percentiles as a primary measurement of quality may affect peer review outcomes. This publication describes how such changes relate to DRG study sections. The reader is cautioned, however, that observed changes in the data cannot be simply attributed to either changes in the quality of the applications or to the behavior of study sections. Rather, the basis for observed changes might be due to some complex, nonobvious sources.

NIH extramural staff re-examine the NIH peer review system constantly for potential improvements. These studies and their results are included in *PEER REVIEW TRENDS* from time to time. Suggestions for changes and additions to this publication are welcome. Please direct them to William E. McGarvey, Ph.D., who has the principal responsibility for this publication. Dr. McGarvey can be reached at 301/594-7328 (voice), 301/594-7394 (facsimile), or QGM@DRGPO.DRG.NIH.GOV (E-Mail). Correspondence should be addressed to him in care of the Statistical Analysis Unit, Statistics, Analysis, and Evaluation Section, Information Systems Branch, Division of Research Grants, National Institutes of Health, Bethesda, Maryland 20892.

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HIGHLIGHTS

- The number of competing grant applications submitted annually for NIH review increased (by 7,137) to **31,145** from 1983 to 1992, while requested dollar support increased from \$2.3 billion to **\$4.8 billion**. The majority of applications in 1992 (54.1 percent) were Traditional Research Projects (R01) reviewed by DRG. More than 79 percent of all applications, or **24,708**, were referred to DRG study sections for review. Individual Institutes and Centers are reviewing an increasing proportion of the applications, and these are much more diverse than those reviewed by DRG. (Pages 2-7) (Unless specifically stated, the remaining highlights refer to DRG-reviewed competing R01 applications.)
- The number of competing amended R01 applications continues to grow; it grew by more than 51 percent over the decade, from 3,680 to 5,576 (23.8 percent to 35.5 percent). (Pages 10-15)
- In 1990, approval rates increased to over 95 percent, with a modal outcome of **approved, but not funded** for R01 applications (75.9 percent in 1990). Partly as a result of this, the concept of disapproval has been discarded (effective October 1991) in favor of a new and re-defined classification of "not recommended for further consideration" (NRFC). (Pages 16-19, 24f.)
- After moving toward 100 for seven years and then reversing that trend in 1989 with the advent of percentile scores and standardized adjectives, **mean R01 priority scores have, since 1990, again begun to exhibit a "creep" toward 100**. (Pages 22-33)
- Every year, R01 applications requesting more years of support consistently receive better scores than those requesting fewer years of support; most (49.6 percent) R01 applications -- excluding amendments -- now ask for **5 or more years of support**. In 1983, 59.6 percent of R01 applications asked for only 3 years of support, while 24.0 percent asked for 5 or more years of support. (Pages 42-51)
- While the number of R01 competing grant applications assigned to different Institutes remained remarkably stable over the decade, **NIAID** experienced the largest absolute increase (up 386 to 1,721). **NCI** had the largest absolute decrease (down 373 to 2,508). (Pages 52-57)

- R01 applications were almost three times more likely to come from those with a Ph.D. and other research degrees than those with an M.D. and other clinical degrees. Their 1992 mean scores, however, differed only slightly. (Pages 60-67)
- Despite the availability of FIRST (R29) awards, **the number of R01 applications from the youngest researchers has continued to decline.** Nonetheless, young researchers do receive significantly superior priority scores. (Pages 68-73)
- Since 1986, mean R01 priority scores of **male and female applicants were essentially equivalent.** Of the 1992 applicants, 18.7 percent were female, as compared with 14.8 percent of the 1983 applicants. (Pages 74-81)
- Minority investigators submitted 13.7 percent of 1992 R01 grant applications; most (10.6 percent of all R01 applicants) were Asian/Pacific Islanders. (Pages 82-87)
- R01 applications from Basic Science departments were consistently rated with better average priority scores than R01 applications from Clinical Science departments. (Pages 96-99)

TECHNICAL NOTES

1. **IMPAC (Information for Management, Planning, Analysis, and Coordination):** The NIH Division of Research Grants' computer-based system for information about PHS extramural programs, and the primary source of information for this report.
2. **FISCAL YEAR:** Data about study section actions (e.g., priority scores or percentile ranks) in this report are compiled primarily by fiscal year of initial review group meeting. This includes the January, May, and August/October Council meetings of the indicated year; prior to 1978, it included March and May/June meetings of the indicated year plus the November meetings of the prior calendar year. Data related to funding of applications (e.g., success rates) are compiled for the funded applications by fiscal year of appropriation, and for unfunded applications, by requested start date.
3. **WORKLOAD STATISTICS:** In Section 1, these refer to applications assigned to DRG study sections for review. The DRG workload also includes receipt and referral of all applications to both DRG and Institute review panels. Sections 2 to 7 refer to the actions of DRG study sections (except where noted) and exclude applications that were either withdrawn by applicants or deferred by study section action. In this report, an application normally includes the initial application and any amendments that are reviewed in the same fiscal year.
4. **THE CRITERIA FOR RESEARCH PROJECT REVIEW:** These include (a) scientific significance and originality; (b) research design; (c) qualifications and experience of the principal investigator and staff; (d) scientific and administrative environment; (e) appropriateness of the budget; and (f) adequacy of protection for humans, animals, or environment, where applicable.
5. **REVIEW:** Effective in 1992, an application designated as "reviewed" has either received a priority score or has been labeled "Not Recommended for Further Consideration". In this publication, applications assigned to DRG study sections for review but subsequently withdrawn or deferred are not counted as reviewed.
6. **STUDY SECTION ACTION:** An application that has been recommended for further consideration by a DRG study section is considered of sufficient scientific merit to be worthy of support. Therefore, a study section's action is a recommendation that an award be made -- provided that other ICD Advisory Council criteria are satisfied. This recommendation can be for the time and amount requested or for an adjusted time and amount. Study sections assign a priority rating of 100 (highest merit) to 500 (lowest merit) to each application. Generally, percentile ranks are also computed based upon these priority scores. These ranks are intended to suggest relative scientific worth to the Councils.

7. **DOCTORAL DEGREES:** Among the cases classified as an M.D. are those with the following degrees: M.D., B.M., M.B., B.M.D., Med. B.S., and F.R.C.P. Among the cases classified as a Ph.D. are those with the following degrees: Ph.D., Ed.D., D.Eng., D.Sc., Ed.D., Sc.D., D.Phil., D.P.E., D.S.N., D.Phil., D.P.H., D.R.P.H., D. Ed., D.N.S., D.N.Sc., D.S.W., and Psy.D. All other degrees are classified as *Other*.
8. **PRIORITY SCORES:** These show a study section's evaluation of the relative scientific and technical merit of research applications. Using an interval of 0.1, individual members assign scores from 1.0 (highest merit) to 5.0 (lowest merit). Under laws governing NIH's chartered Advisory Committees, only regular members or members of the NIH Reviewers Reserve (not *ad hoc* consultants) are permitted to vote on application quality. Votes were cast in 0.5 intervals intermittently until 1980. Since then, in order to achieve more precise scoring, votes have been cast in 0.1 intervals. The raw three-digit priority scores, which can range from 100 to 500, are the average of member votes multiplied by 100.
9. **NORMALIZED SCORES:** In addition to raw scores, these were calculated from November 1971 to May 1980 in an effort to make priority scores of the different study sections more comparable. These normalized standard scores represented the mathematical transformation of raw scores to a normal distribution having an overall mean of 250 and a standard deviation of 70. They were based on each study section's priority scores for all approved applications from the study section's last three meetings. Some Institutes used normalized scores; others retained the raw score as a primary basis for funding decisions. The use of normalized scores was discontinued in 1980 because of unresolved problems associated with their use, including the confusion induced by double scores (actual and normalized). In addition, normalization did not apply to *ad hoc*, special, and small committees, nor for activities other than research grants.
10. **PERCENTILING:** This is the mechanism that has been the major determinant of the funding decisions of all Institutes since the October 1988 Advisory Council. Each study section's approved applications are ranked in percentiles according to priority scores given in the current and previous two rounds. The percentiling procedure has a normalizing effect on study section scores, but without the transposition to a normalized score. As with priority scores, the lower the numerical value, the greater the merit of the application. A basic assumption of percentiling is that the quality of reviewed applications is roughly equivalent among all study sections but that there are differences among study sections in rating behavior.
11. **CARRYOVERS:** These are grant applications which are approved in a given year but not funded in that year; they are kept active from one fiscal year to the next.
12. **THE SUCCESS RATE FILE:** A DRG computer file established in 1978 to provide award data for budget reporting and computation of success rates. This file substitutes amendments for the initial application if both are reviewed in the same fiscal year. Such a substitution eliminates the distortion of success statistics that would occur if both the original application and its amendments were counted as separate applications in any given year.

13. **SUCCESS RATE:** The percentage of reviewed applications that receive funding. Specifically, it is the number of competing applications to be funded divided by the number of applications reviewed, expressed as a percentage. Carryovers are included in both the numerator and denominator in the fiscal year they are funded. Applications that have one or more amendments are counted only once in success-rate computations. Success rates are influenced by a combination of factors, including study section action, Council recommendation, Institute program relevance, and funds available. They are included for selected categories throughout this report.
14. **SUMMARY STATEMENTS:** These inform the Council and the Institutes of the evaluations and recommendations of initial review groups (IRG's); they also provide the applicant with information about the review of his or her application. They include a summary of the initial review group's comments and discussion plus the assigned priority score, percentile rank, dollar support requested and recommended, and a roster of the reviewers. Numerous NIH policy changes have progressively made more information available earlier to applicants. Prior to 1979, review comments were provided only on request. Since 1984, summary statements with the priority score and percentile rank have been released after scientific review but prior to Council review. Summary statements are prepared by Scientific Review Administrators (SRA's) who are NIH employees.
16. **DRG DEPARTMENT CLASSIFICATIONS:** These are an adaptation of the codes established by the American Association of Medical Colleges (AAMC). Basic science departments include anatomy, biochemistry, biology, biophysics, chemistry, genetics, microbiology, pathology, pharmacology, physics, physiology, zoology, and other basic sciences. Clinical science departments include anesthesiology, dermatology, family practice, medicine, neurology, obstetrics, gynecology, ophthalmology, orthopedic surgery, otolaryngology, pediatrics, physical medicine and rehabilitation, psychiatry, public health and preventive medicine, radiology, surgery, and other clinical sciences.
17. **AGE:** This is computed as of October of a given fiscal year.
18. **DISAPPROVAL VERSUS NRFC:** Prior to 1992, applications were disapproved because a majority of study section members felt that a project was not of *sufficient* scientific merit or because they had human subject, animal welfare, or biohazard concerns. Currently, applications which do not have *significant and substantial* merit or that raise human subject, animal welfare, or biohazard concerns are labeled "Not Recommended for Further Consideration" or NRFC.

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1. WORKLOAD OF DRG STUDY SECTIONS

Applications and requested support as percentages of NIH total, DRG-
and Non-DRG reviewed

Number of applications reviewed by DRG review groups by grant activity

Number of applications reviewed by Non-DRG review groups by grant activity

Number of DRG-reviewed R01 applications by type (new, competing continuations)

Increase in DRG-reviewed R01 amendments

Number of DRG-reviewed R01 applications with one or more amendments

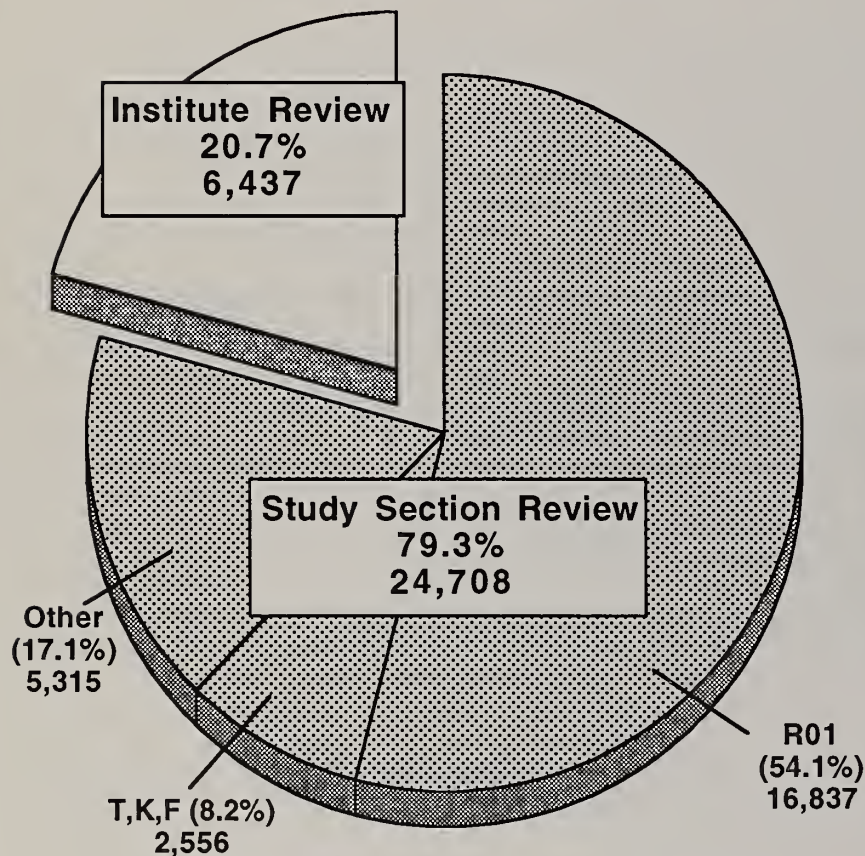
Proportion of DRG-reviewed R01 amendments by type (new, competing continuation)

DRG-reviewed R01 applications by funding status

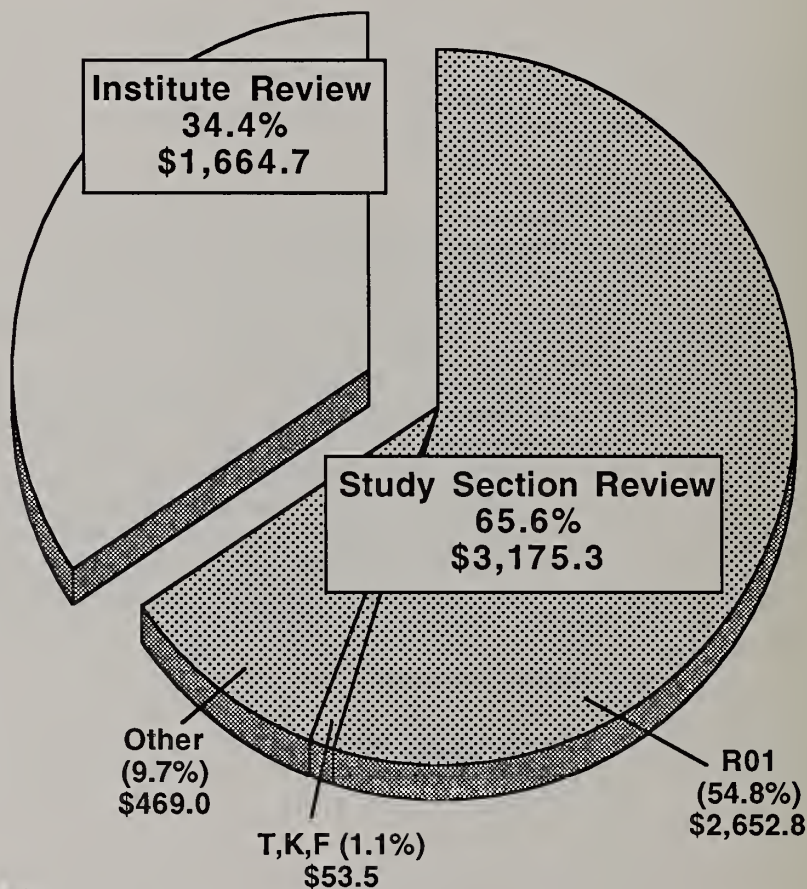
DRG-reviewed R01 applications by funding status and type (new, competing continuation)

NIH Extramural Grant Support Requested by Competing Applications* Submitted for DRG Study Section or Institute Review, FY1992

31,145 Applications



\$4,840.0 Million Requested*



*Summarized by fiscal year of initial review. Direct cost requested in first year.
Workload statistics include withdrawals and deferrals, and exclude NIAAA, NIDA, and NIMH data.
Other includes: C06, P01, P41, R03, R13, R15, R18, R22, R29, R37, R43, R44, and U01.
Source: NIH, DRG, ISB, SAES

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In FY 1992, there were 31,145 competing grant applications submitted to NIH and processed by the Division of Research Grants (DRG). (N.B. These statistics do *not* include data for NIAAA, NIDA, or NIMH. Subsequent versions of this book will.) Approximately 79 percent (24,708) of the competing applications were assigned for review to study sections, which are managed by DRG. The remaining 20.7 percent (6,437) were assigned to review groups in the various Institutes. Traditional Research Projects (R01) reviewed by DRG accounted for about 54 percent (16,837) of total NIH competing applications. **Traditional Research Projects (R01) assigned to DRG for review are the primary focus of this report, and unless otherwise stated, are the only data provided here.** At the outset, however, a context for these R01's is appropriate so as to make manifest the variety of other forms of NIH support and review.

Though the absolute number of applications assigned to DRG study sections for review has grown, the proportion has declined by seven percentage points since 1983. This is due primarily to shifts in numerous smaller programs rather than to a single program or policy change. Research Career Development (K04) applications, for example, declined significantly. Among Institute reviews, Clinical Investigator Awards (K08), Physician Scientist Awards (K11), Small Grants (R03), Center Grants (P30, P40, P50, P60), Cooperative Agreements (U01), and certain research project applications submitted in response to Requests for Applications grew significantly.

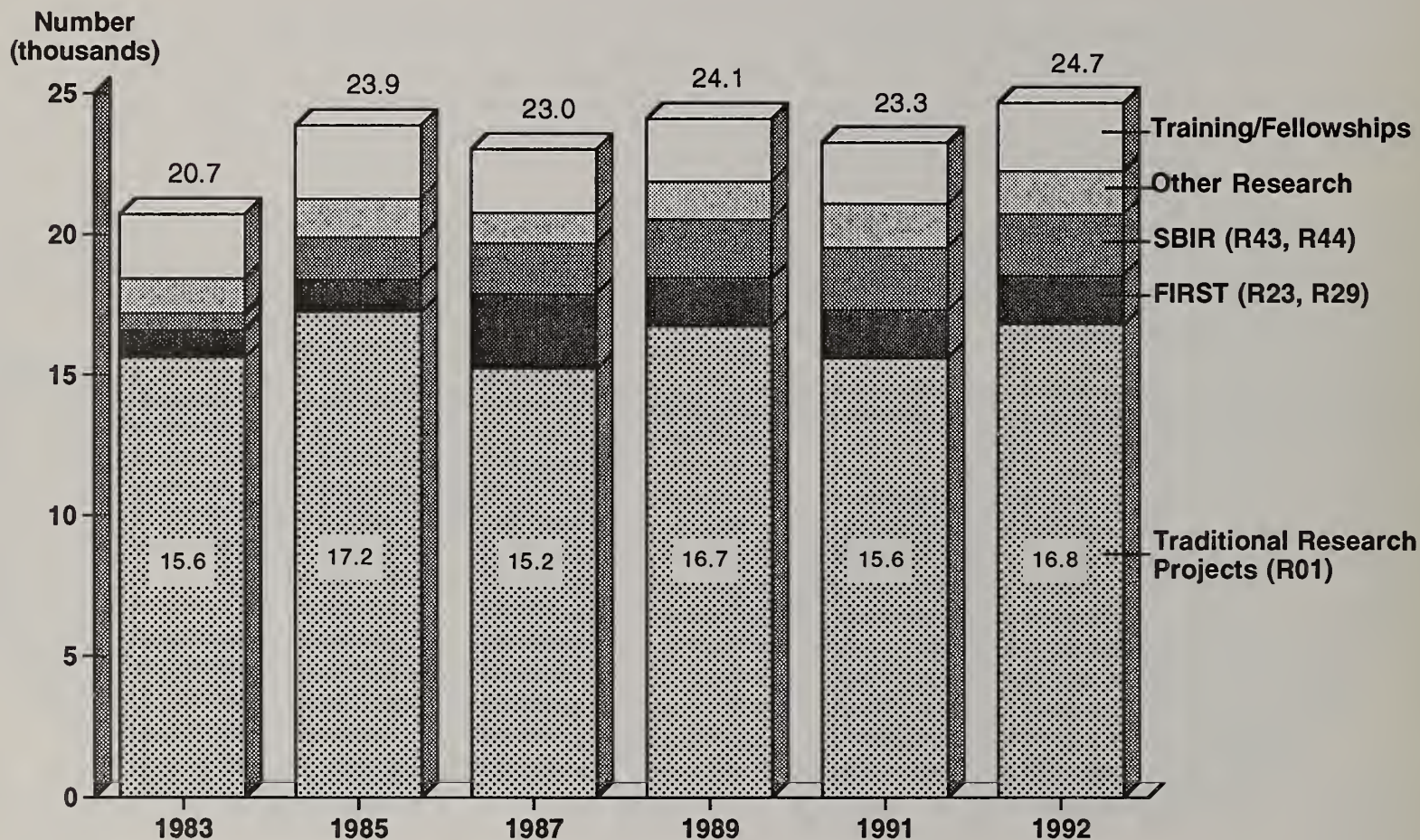
FY 1992 applications assigned to DRG study sections for review accounted for 65.6 percent of the money requested, or 3.2 of the 4.2 billion dollars in requested support for the first year of competing applications.

	Applications* (in percentages)				Percentage of Requested Dollars (000s)		
	1983	1987	1992		1983	1987	1992
DRG Review....	86.3	79.6	79.3		73.1	63.8	65.6
R01.....	65.1	52.7	54.1		62.5	50.0	54.8
T,K,F...*	10.6	8.5	8.2		2.3	1.4	1.1
Other**	10.6	18.3	17.1		8.3	12.5	9.7
Inst. Review..	13.7	20.4	20.7		26.9	36.2	34.4
R01.....	2.0	5.2	4.0		2.4	6.6	5.4
T,K,F.....	3.2	5.1	4.9		3.1	3.5	3.5
P.....*	2.5	1.9	2.7		15.1	14.4	14.0
Other**	6.0	8.2	9.1		6.2	11.7	11.5
Total.....	100.0	100.0	100.0		100.0	100.0	100.0
Number.....	24,008	28,934	31,145	Millions	2,271.2	3,627.9	4,840.0

*Workload statistics summarized by fiscal year of IRG review.

**See subsequent pages.

Number of Competing Grant Applications* Assigned to DRG Study Sections Fiscal Year of Initial Review 1983-1992†



*Workload statistics include applications deferred or withdrawn prior to review.

†Selected years.

Source: NIH, DRG, ISB, SAES

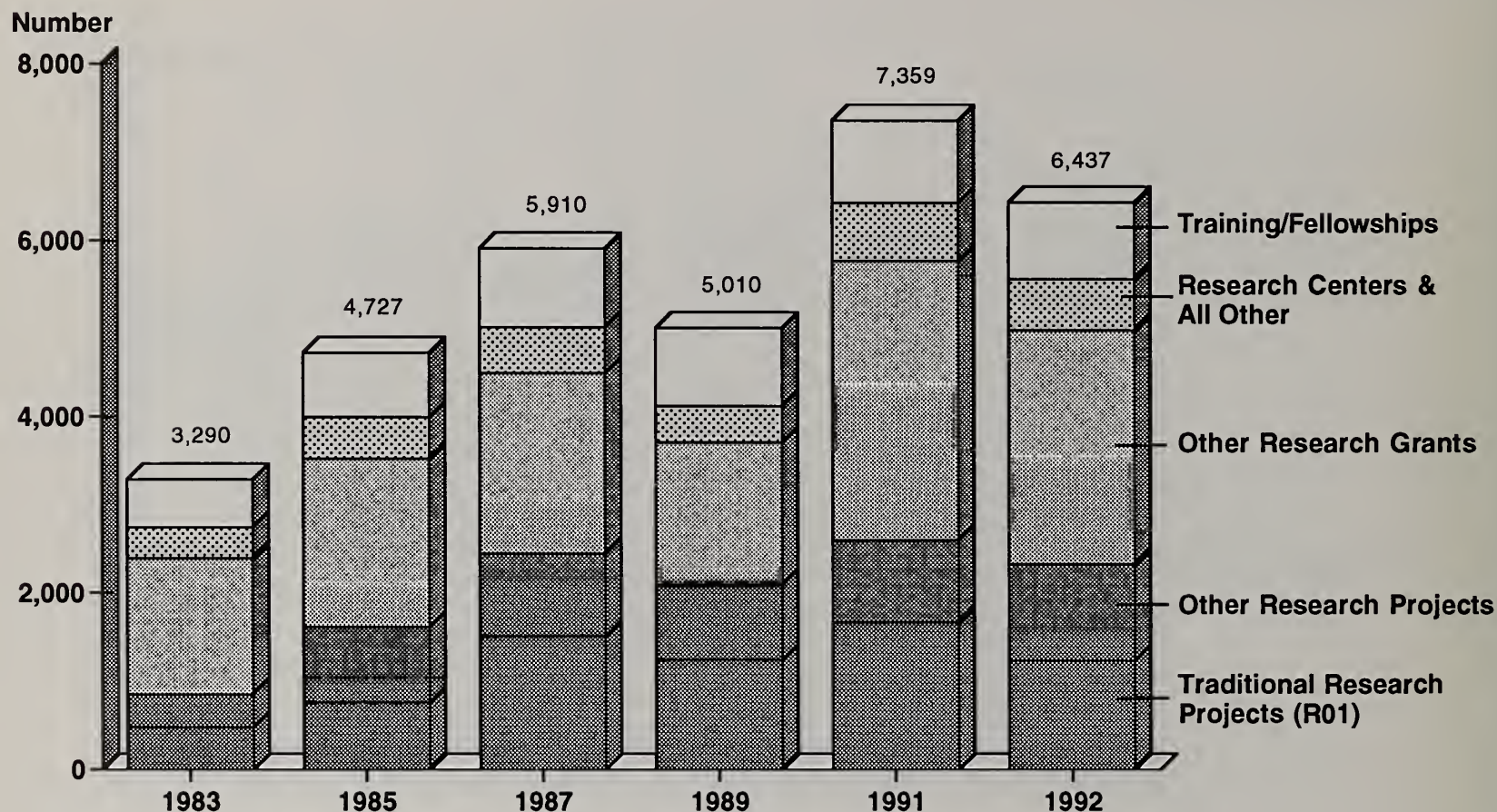
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Competing applications assigned to study sections for review increased from 20,718 in FY 1983 to 24,708 in 1992--up 3,990 applications. Traditional research project applications (R01's) increased from 15,618 to 16,837 between 1983 and 1992. New Investigator Research (R23), subsequently called FIRST Awards (R29); Small Business Innovation Research (SBIR) Grants (R43, R44); Academic Research Enhancement Awards (AREA, or R15); and Biomedical Research Support Shared-Instrumentation Grants (S10) were principal gainers. These were partially offset by declines in Research Career Development Awards (K04). A fuller description of these activities can be found in the Appendices (pp. 130f.).

Activity	Number of Applications*					
	(Summarized by FY of Initial review)					
	1983	1985	1987	1989	1991	1992
Traditional Research Projects (R01).....	15,618	17,245	15,245	16,735	15,605	16,837
Other Research Projects.....	1,869	2,756	4,542	3,921	4,029	3,998
P01.....	33	21	24	17	18	12
P41.....	43	4	2	0	0	1
R22.....	119	92	73	91	60	43
R23.....	997	1,162	23	6	5	1
R29.....	0	1	2,634	1,728	1,723	1,732
R43, R44.....	573	1,475	1,784	2,079	2,223	2,191
U01.....	108	1	2	0	0	18
Other Research Grants.....	932	1,225	972	1,210	1,443	1,426
R15.....	0	426	258	713	617	568
S10.....	274	262	291	221	420	480
K04.....	284	359	221	152	107	119
R13.....	38	54	62	63	84	74
R03.....	236	29	21	22	12	56
R43,R44.....	66	72	80	21	20	12
K01,K08,K10,K11,R10,R18,R21, R23,R24,R25,R26,R29,U10.....	34	23	39	18	183	117
Research Centers						
P30,P40,P41,P50,U41.....	28	43	23	21	32	31
Other Activities						
C06,D43.....	0	0	0	0	5	0
Training Grants						
T01,T02,T03,T15,T22,T32,T35.....	12	31	19	24	11	11
Fellowships.....	2,259	2,580	2,223	2,200	2,158	2,405
F32.....	1,938	2,216	1,895	2,004	1,833	2,061
F05,F06,F07,F20,F31,F33.....	321	364	328	196	325	344
Totals.....	20,718	23,880	23,024	24,111	23,283	24,708

*The above statistics include up to 1,100 applications per year that are subsequently deferred or withdrawn. These are excluded from this report's other statistics, which deal with actions of study sections (Chapters 2-6). Because investigators may not apply for MERIT (Method to Extend Research In Time) awards, MERIT (R37) figures have been included with the Traditional Research (R01) totals.

Number of Competing Grant Applications* Assigned to Non-DRG Review Groups Fiscal Year of Initial Review 1983-1992†



*Workload statistics include applications deferred or withdrawn prior to review.

†Selected years.

Source: NIH, DRG, ISB, SAES

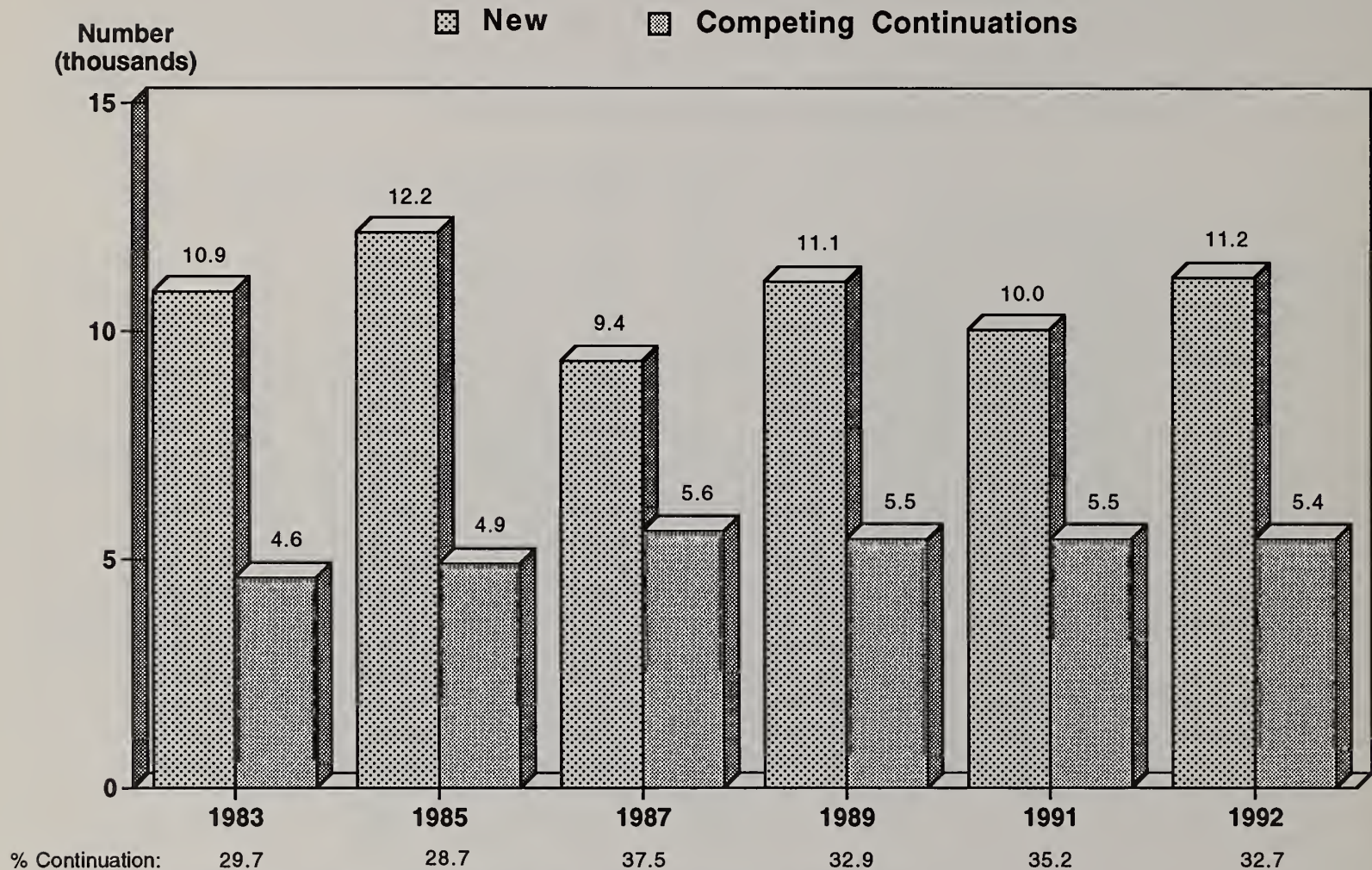
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Competing applications assigned to Institute review groups increased from 3,290 in FY 1983 to 6,437 in 1992 -- a 96 percent increase. Traditional research project applications (R01's) were part of this surge, increasing from 477 to 1,235 between 1983 and 1992. (Virtually all, or at least a majority, of these came in response to RFA's.) While most of the activities have shown growth, these data suggest that the Institutes have to deal with a much more diverse set of applications than does the Division of Research Grants. The main types of research proposals referred to the Institutes were either large in scale (P01's) or small in scale (R03's). P01 applications grew by 31 percent, while R03 applications increased from 567 in 1983 to 854 in 1992. Also showing substantial growth were the area of Cooperative Agreements (the U series, particularly U01), and Research Career Programs (the K series, especially the Clinical Investigator Award, or K08). These data also show that most fellowship applications are reviewed by DRG, while most training grant applications are reviewed by the Institutes. A fuller description of these activities can be found in the Appendix (pp. 130f.).

Activity	Number of Applications*					
	(Summarized by FY of Initial review)					
	1983	1985	1987	1989	1991	1992
Traditional Research Projects (R01).....	477	762	1,511	1,245	1,669	1,235
Other Research Projects.....	380	851	974	845	931	1,121
P01.....	368	428	445	437	476	482
U01.....	3	313	417	371	436	541
P42,R23,R29,R35,R43,R44,U01.....	9	110	112	37	19	98
Other Research Grants.....	1,542	1,912	2,050	1,619	3,172	2,655
R03.....	567	453	429	378	800	854
S03.....	0	0	0	0	390	386
K08.....	100	446	306	295	305	360
R13.....	171	217	211	218	255	269
U10.....	299	126	266	154	256	152
K11.....	0	136	169	150	158	137
D42,K01,K04,K07,K10,K12,K14,K15,K16,R10,R15, R18,R21,R23,R24,R25,R26,R29,R43,R44,S06,S07, S11,S14,S15,U09,U18,U24,U26,U50.....	405	534	669	424	1,008	497
Research Centers.....	281	366	330	360	470	421
P50.....	113	133	119	137	114	123
P20.....	23	1	0	32	59	105
M01.....	57	103	84	66	65	77
P30.....	51	50	49	100	128	65
G12,P40,P41,P51,P60,U40,U41,U42,U54.....	37	79	78	25	104	51
All Other (C06,G07,G08,G20,P41,P50).....	66	104	150	52	187	133
Training Grants.....	470	597	550	560	603	602
Fellowships.....	74	133	345	329	327	270
Total.....	3,290	4,727	5,910	5,010	7,359	6,437

*For economy of presentation, selected mechanism statistics have been presented based upon the most frequent activities as of FY 1992.

Number of Competing R01 Applications* Assigned to DRG Study Sections, FY1983-1992†



*Summarized by fiscal year of initial review; excludes supplements; workload statistics include applications deferred or withdrawn prior to review.

† Selected years.

Source: NIH, DRG, ISB, SAES

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New R01 applications assigned to DRG study sections for review increased from 10,876 (1983) to a peak of 12,173 (1985). They then declined to 9,360 in 1987 and rose again to 11,189 in 1992.

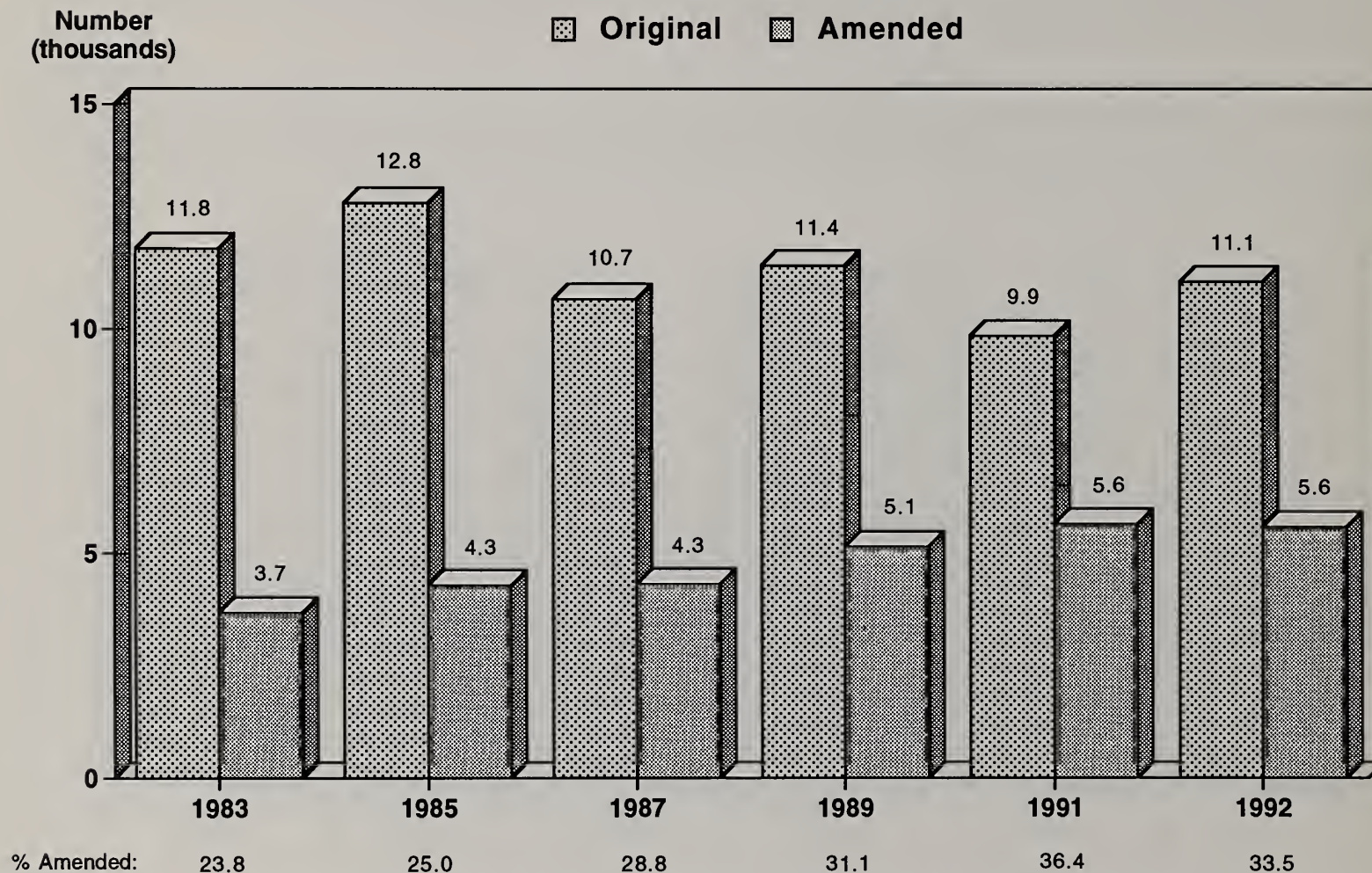
From 1983 to 1992, competing continuations rose proportionately more (approximately 18 percent), from 4,601 in 1983 to 5,448 in 1993. They followed the general pattern of new applications after the 3-year lag expected for competing continuations. In the 1987 peak year for competing continuations, about 38 of 100 R01 applications were competing continuations; by 1992, however, this had dropped to approximately 33 of every 100. New applications, then, have shown greater volatility over this period, while competing continuations have reached a plateau of about 5,400.

<u>Fiscal Year</u>	<u>Total* R01's</u>	<u>New</u>	<u>Competing Continuations</u>	<u>Percent Competing Continuations</u>
1983.....	15,477	10,876	4,601	29.7
1984.....	16,314	11,543	4,771	29.2
1985.....	17,083	12,173	4,910	28.7
1986.....	16,071	10,549	5,522	34.4
1987.....	14,986	9,360	5,626	37.5
1988.....	14,989	9,643	5,346	35.7
1989.....	16,554	11,101	5,453	32.9
1990.....	16,699	11,330	5,369	32.6
1991.....	15,498	10,046	5,452	35.2
1992.....	16,637	11,189	5,448	32.7
Change (1983-87).....	-491	-1,516	+1,025	+7.8
Change (1987-92).....	+1,651 *	+1,829	-178	-4.8

Workload statistics summarized by fiscal year of IRG review.

*Excludes competing supplements.

Number of Original and Amended R01 Applications* Assigned to DRG Study Sections, FY1983-1992†



*Summarized by fiscal year of initial review; excludes supplements; workload statistics include applications deferred or withdrawn prior to review.

† Selected years.

Source: NIH, DRG, ISB, SAES

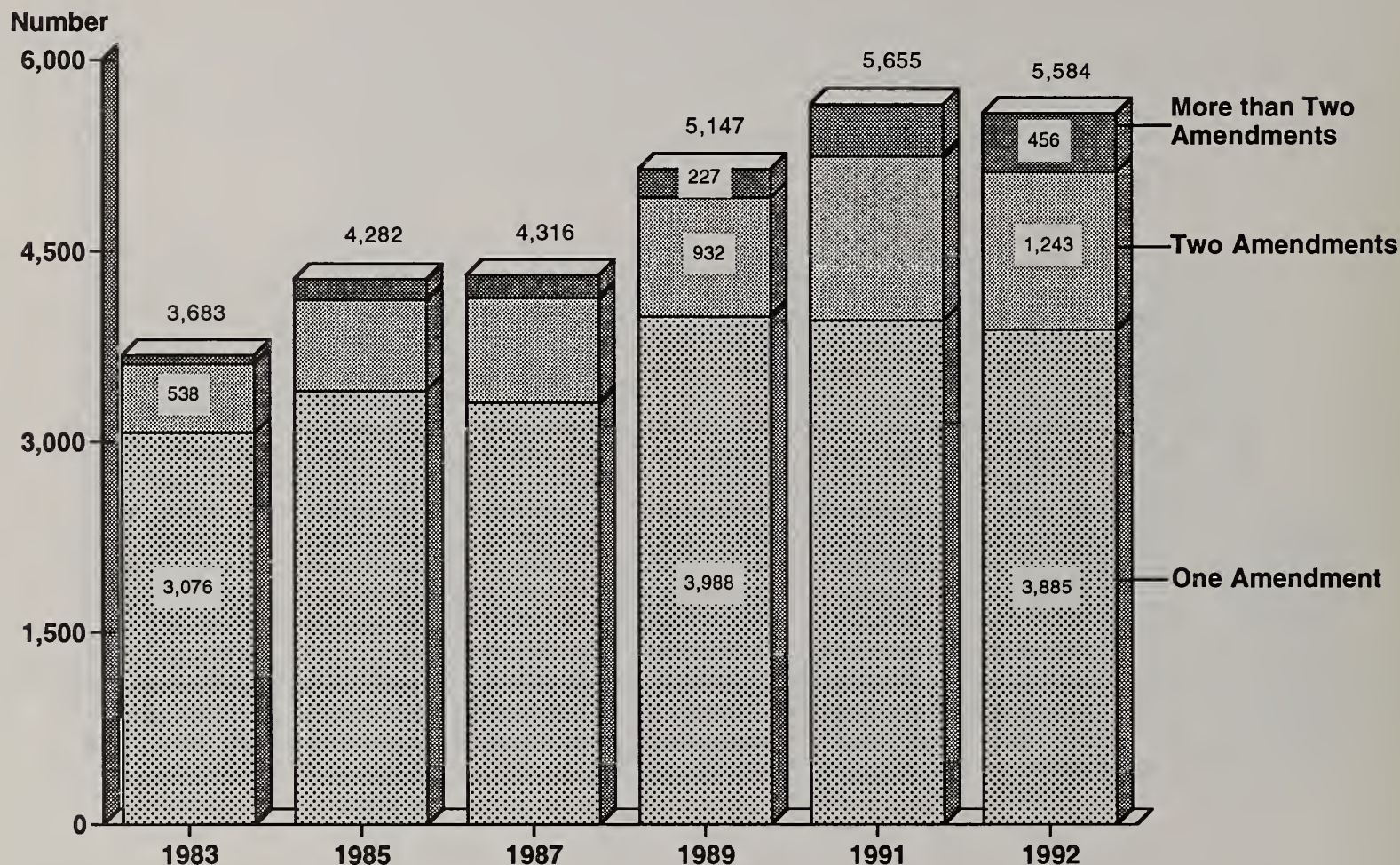
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A major trend in R01 applications has been the increase in amendments to previously reviewed applications. NIH policy changes since 1979 authorizing summary statements with progressively more and earlier feedback to applicants, probably contributed to the increase in the number and proportion of amended R01 applications. Another cause was that the number of favorably recommended but unfunded applications increased significantly. Since 1983, amendments increased to 4,376 in 1986, declined slightly in 1987 and 1988, and increased again in 1990 to a decade high of 5,743 (a 56 percent increase since 1983). Amended applications have declined, but only slightly, in the succeeding years. While the number of nonamended applications declined about 6.2 percent from 1983 through 1992, the percentage of amended applications grew from 23.8 percent to 33.5 percent over the same period.

<u>Year</u>	<u>Amendments</u>			<u>Nonamendments</u>		
	<u>Total*</u>	<u>New</u>	<u>Competing Continuation</u>	<u>Total*</u>	<u>New</u>	<u>Competing Continuation</u>
1983.....	3,680	2,315	1,365	11,797	8,561	3,236
1984.....	3,856	2,608	1,248	12,458	8,935	3,523
1985.....	4,279	2,930	1,349	12,804	9,243	3,561
1986.....	4,376	2,817	1,559	11,695	7,732	3,963
1987.....	4,314	2,545	1,769	10,672	6,815	3,857
1988.....	4,043	2,325	1,718	10,946	7,318	3,628
1989.....	5,143	3,208	1,935	11,411	7,893	3,518
1990.....	5,743	3,543	2,200	10,956	7,787	3,169
1991.....	5,647	3,373	2,274	9,851	6,673	3,178
1992.....	5,576	3,356	2,220	11,061	7,833	3,228
Change (1983-87) ..	+634	+230	+404	-1,125	-1,746	+621
Change (1985-90) ..	+1,464	+811	+451	+389	+1,018	-629

*Workload statistics are summarized by fiscal year of IRG review, include withdrawals and deferrals, and exclude competing supplements.

Number of Competing R01 Applications* Reviewed by DRG Study Sections with One or More Amendments, FY1983-1992†



*Summarized by fiscal year of initial review; includes supplements. Workload statistics include applications deferred or withdrawn prior to review.

† Selected years.

Source: NIH, DRG, ISB, SAES

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The proportion of second or third amendments to R01 applications also continues to increase. However, these multiple amendments (and therefore total amendments) are probably understated in the IMPAC data system by an unknown amount. DRG procedures have permitted and sometimes encouraged the submission of amended applications beyond the third revision as new applications with new numbers.

Number of Amendments	<u>1983</u>	<u>1985</u>	<u>1987</u>	<u>1989</u>	<u>1991</u>	<u>1992</u>
1	83.5	79.4	76.7	77.5	70.0	69.6
2	14.6	16.8	19.1	18.1	22.7	22.3
More than 2.....	1.9	3.8	4.2	4.4	7.3	8.1
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Number.....	3,683	4,282	4,316	5,147	5,655	5,584

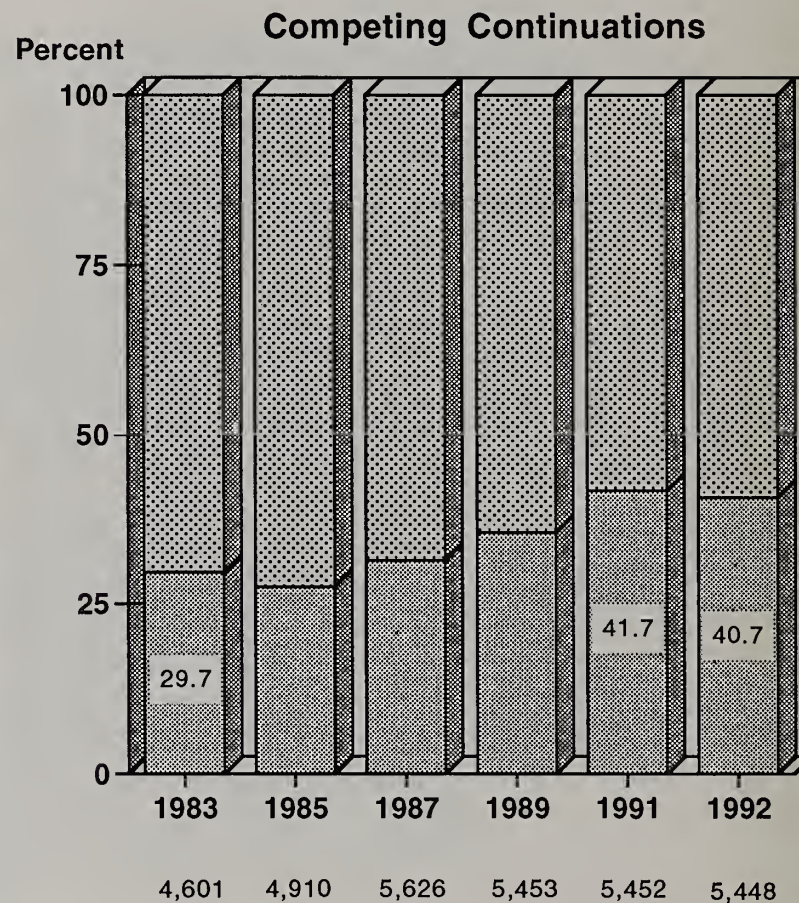
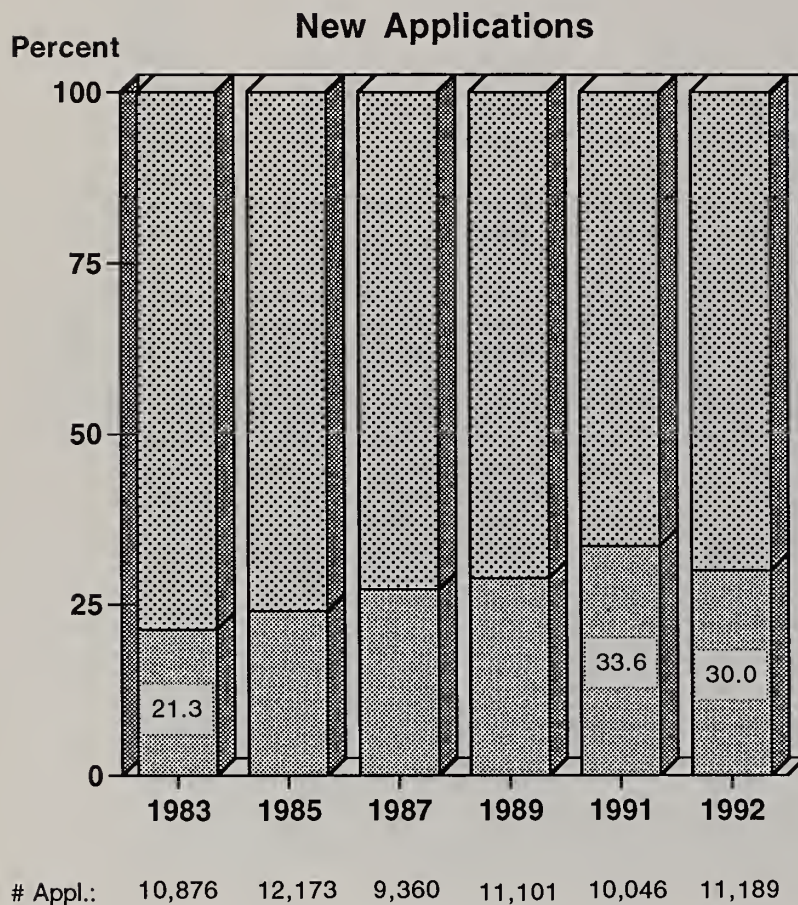
The number of applications either withdrawn or deferred from DRG review declined approximately 25 percent over the period FY 1983-1992. By contrast, the number of applications either withdrawn or deferred from Institute review declined 3.9 percent. At DRG, withdrawn applications actually increased slightly (0.6 percent), while deferred applications declined by more than 51 percent. Withdrawn Institute-reviewed applications increased markedly (36.1 percent) while their deferred applications dropped (43.6 percent).

	<u>DRG*</u>				<u>Non-DRG*</u>			
	<u>1983</u>	<u>1987</u>	<u>1991</u>	<u>1992</u>	<u>1983</u>	<u>1987</u>	<u>1991</u>	<u>1992</u>
Withdrawn...	462	708	470	465	219	391	254	298
R01.....	305	474	332	325	52	103	51	103
Other.....	157	234	138	140	167	288	203	195
Deferred....	427	349	197	207	220	214	193	124
R01.....	341	263	157	166	129	115	86	58
Other.....	86	86	40	41	91	99	107	66
Total.....	889	1,057	667	672	439	605	447	422

*Workload statistics summarized by fiscal year of IRG review.

Amendments as a Percentage of Competing R01 Applications* Assigned to DRG Study Sections, FY1983-1992†

■ Amendments ■ Originals



*Original and amended applications summarized by fiscal year of initial review. Workload statistics include withdrawals and deferrals.

†Selected years.

Source: NIH, DRG, ISB, SAES

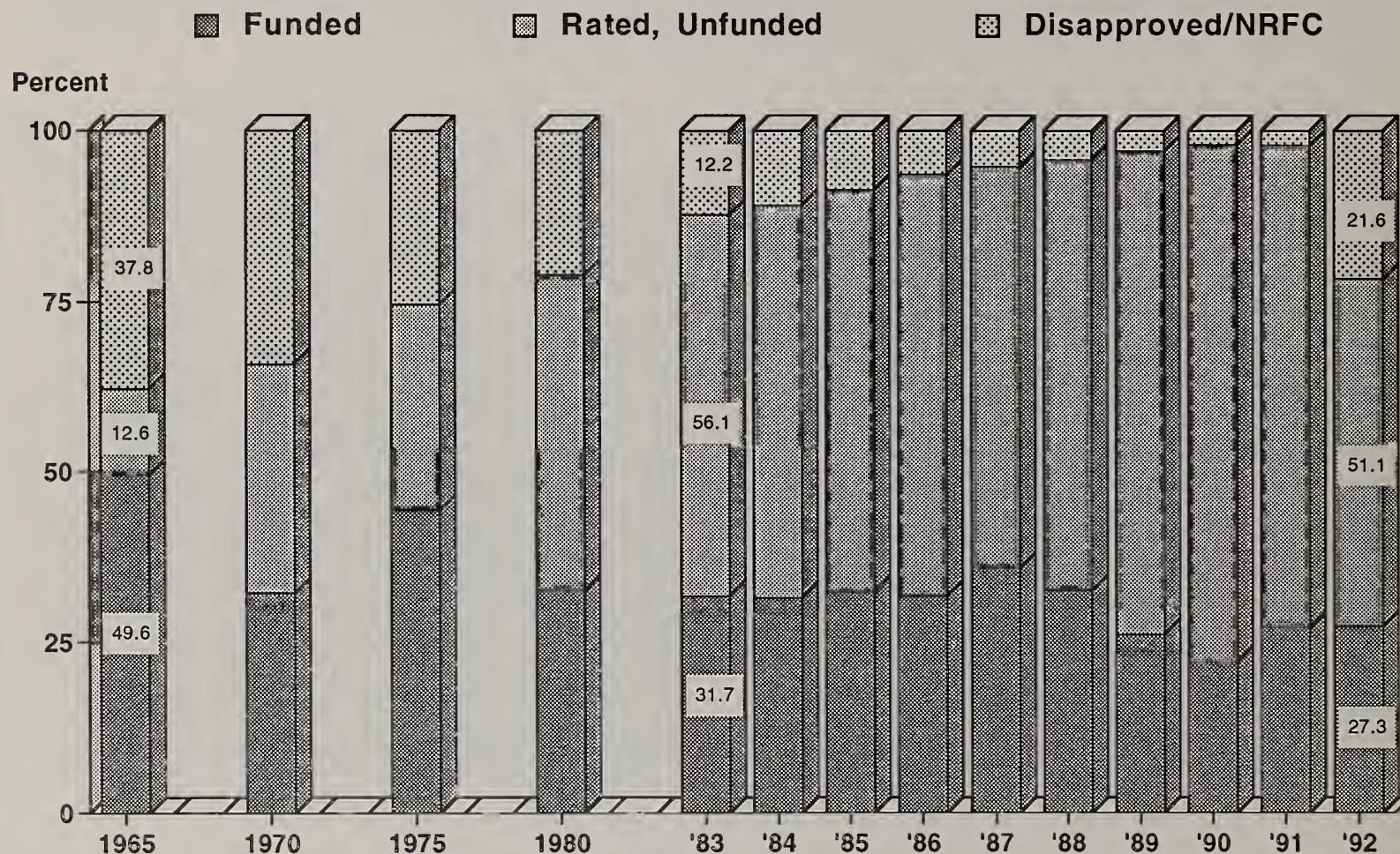
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Amendments to new applications increased from 21.3 percent in 1983 to 30.0 in 1992 (+8.7 percentage points). Competing continuations showed an even higher proportion of amendments as applicants sought to ensure continuation of their NIH funding. Amendments to competing continuations increased steadily from 29.7 percent in 1983 to a high of 41.7 percent in 1991 (+12.0 points). Clearly, amendments have played a major role in the increase in both new and competing continuation applications since 1983.

<u>Year</u>	<u>Total*</u>		<u>New Applications</u>		<u>Competing Continuations</u>	
	<u>Number</u>	<u>%A</u>	<u>Number</u>	<u>%A</u>	<u>Number</u>	<u>%A</u>
1983.....	15,477	23.8	10,876	21.3	4,601	29.7
1984.....	16,314	23.6	11,543	22.6	4,771	26.2
1985.....	17,083	25.0	12,173	24.1	4,910	27.5
1986.....	16,071	27.2	10,549	26.7	5,522	28.2
1987.....	14,986	28.8	9,360	27.2	5,626	31.4
1988.....	14,989	27.0	9,643	24.1	5,346	32.1
1989.....	16,554	31.1	11,101	28.9	5,453	35.5
1990.....	16,700	34.4	11,330	31.3	5,369	41.0
1991.....	15,498	36.4	10,046	33.6	5,452	41.7
1992.....	16,637	33.5	11,189	30.0	5,448	40.7
Change (1983-87).....	-491	+5.0 pts.	-1,516	+5.9	+1,025	+1.7
Change (1987-92).....	+1,651	+4.7 pts.	+1,829	+2.8	-178	+9.3

*Workload statistics are summarized by fiscal year of IRG review, include withdrawals and deferrals, and exclude competing supplements.

Percentage of Competing R01 Applications* Reviewed by DRG Study Sections by Funding Status, FY1965-1992†



*Summarized by requested start date or fiscal year of funds; excludes withdrawals and supplements. Includes funded carryover (except '65-'69). Data for '70-'92 from success rate file.

†Selected years.

Source: NIH, DRG, ISB, SAES

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Through 1991, the combination of three trends--increasing R01 applications, diminishing disapprovals, and increasingly limited funds--resulted in large numbers of approved but unfunded applications. An important reclassification created the category "Not Recommended for Further Consideration" (NRFC) in 1992. Previously, applications were disapproved because a majority of study section members felt that a project was not of *sufficient* scientific merit or because of human subject, animal welfare, or biohazard concerns. Now, applications that do not have *significant and substantial* merit or that have human subject, animal welfare, or biohazard concerns are labeled NRFC.

Effectively, this decreased the percentage of applications which were approved but not funded. While there was a slight decrease in the number of DRG-reviewed competing R01 applications (14,272 in 1983 to 14,072 in 1992), the number that received NIH funding has declined markedly (4,543 decreasing to 3,845, a 15.3 percent drop). At the same time, the number disapproved (or not recommended for further consideration) by DRG study sections increased from 1,738 to 3,041. Eligible but unfunded applications decreased approximately 10 percent, from 8,033 in 1983 to 7,212 in 1992. Before 1976, the number funded often equaled or exceeded the number approved but unfunded. Thereafter, more approved applications have remained unfunded than have been funded. By 1992, there were 3,845 applications funded, but 7,212 eligible applications were not funded (a ratio of 1.9 to 1).

An increase in amended applications, which, in turn, heightened an already intense competition, is another probable result of decreased chances of funding. By 1992, over 41 percent of the 3,845 funded applications were amendments, well over the approximately 25 percent for 1983. The number of funded initial applications, then, was severely cut (34 percent), from 3,422 to 2,246. The proportion of amended applications that were eligible but remained unfunded has also increased since 1983.

Fiscal Year*	Funded			Rated, Unfunded		
	Total	Amdmnts	%	Total	Amdmnts	%
1983....	4,543	1,121	24.7	8,033	2,027	25.2
1984....	4,540	1,035	22.8	8,287	2,015	24.3
1985....	5,024	1,246	24.8	9,141	2,342	25.6
1986....	4,695	1,188	25.3	9,156	2,310	25.2
1987....	4,631	1,375	29.7	7,596	2,264	29.8
1988....	4,259	1,176	27.6	8,246	2,234	27.1
1989....	3,636	1,104	30.4	9,897	3,091	31.2
1990....	3,266	1,247	38.2	11,244	3,662	32.6
1991....	3,758	1,606	42.7	9,846	3,280	33.3
1992....	3,845	1,599	41.2	7,212	2,554	35.4
Change						
(1983-87)...	+88	+254		-437	+237	
Change						
(1987-92)...	-786	+224		-384	+290	

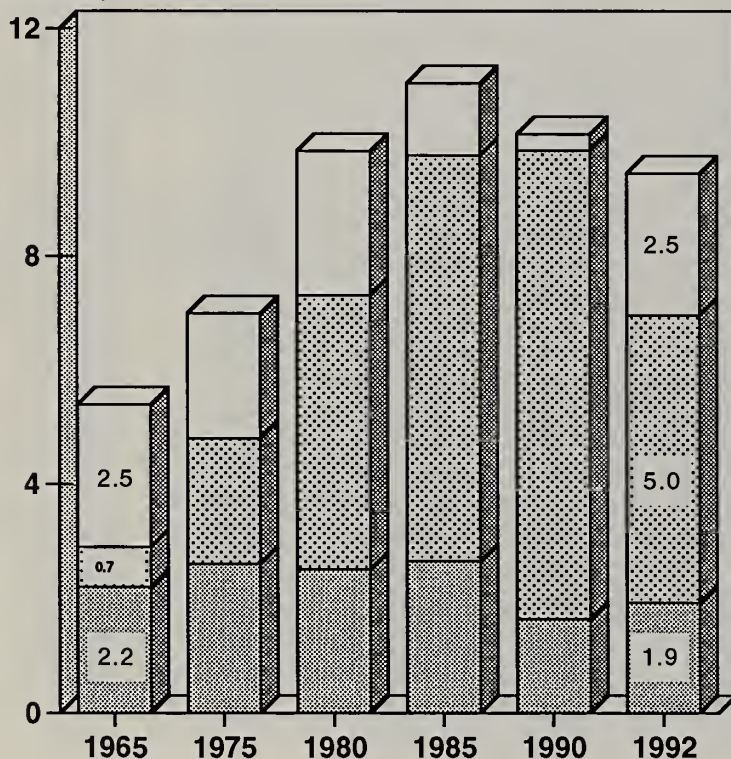
*Summarized from award rate file by fiscal year of funding or requested start date.

Number of DRG-Reviewed Competing R01 Applications,* FY1965-1992† by Funding Status and Type

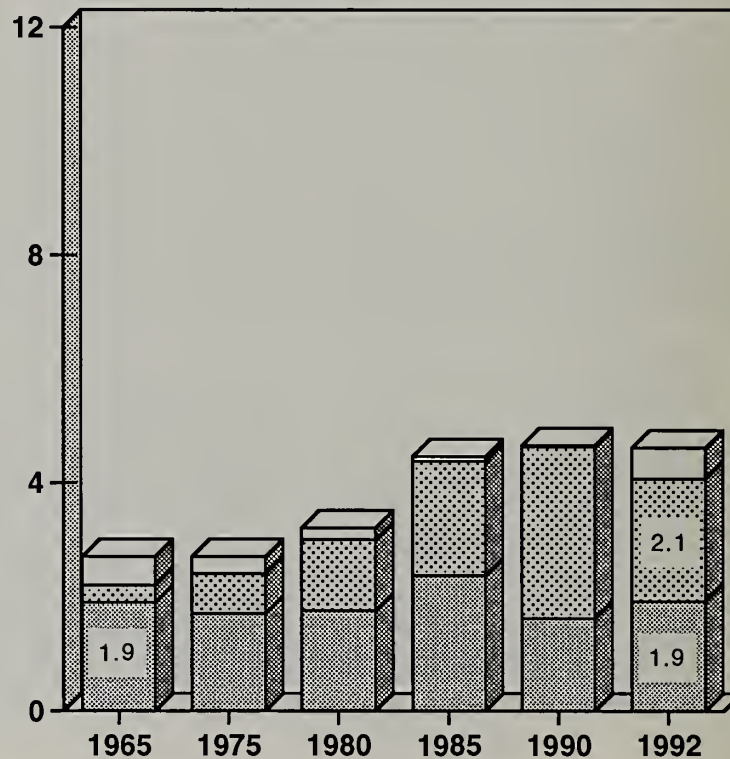
Funded
 Rated, Unfunded
 Disapproved/NRFC

Number
(thousands)

New Applications



Competing Continuations



*Summarized by requested start date or fiscal year of funds. Excludes withdrawals and supplements.
Includes funded carryover (except 1965).

†Selected years.

Source: NIH, DRG, ISB, SAES

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The growth in number of rated but unfunded applications is especially striking among new submissions. In 1983, there were 5,929 (59 percent) new R01 applications of a total 10,005 which were unfunded; by 1991, this had increased to 7,113 of 9,248 applications (77 percent). The increased approval rate contributed to the large numbers of unfunded applications. Effective in 1992, the NIH no longer use the concepts of recommended "approval" or "disapproval;" as a result, the concept of "approved, but not funded" will no longer be appropriate. Instead, as discussed previously, the number of new applications classified as NRFC (Not Recommended for Further Consideration) swelled to a value almost ten times the 1991 "disapproved" count.

Approved but unfunded competing continuation applications also increased substantially, though not as dramatically because of their smaller number. The competing continuation applications which remained unfunded in 1983 were 2,104 of 4,309 (49 percent). They increased to 3,014 of 4,656 (65 percent) by 1990. Increased approval rates had less impact upon competing continuation applications because of their historically high approval rates. With the advent of NRFC (1992), the number of eligible but unfunded competing continuation applications declined sharply (21 percent), but not as sharply as the corresponding component of new applications (29 percent).

<u>New Applications</u>				<u>Competing Continuations</u>		
<u>Year</u>	<u>Funded</u>	<u>Rated, Unfunded</u>	<u>Disapproved/ NRFC</u>	<u>Funded</u>	<u>Rated, Unfunded</u>	<u>Disapproved/ NRFC</u>
1983.....	2,468	5,929	1,608	2,075	2,104	130
1984.....	2,441	6,270	1,470	2,099	2,017	102
1985.....	2,654	7,132	1,259	2,370	2,009	81
1986.....	2,395	6,939	883	2,300	2,217	44
1987.....	2,055	5,406	620	2,576	2,190	46
1988.....	1,906	6,006	508	2,353	2,240	35
1989.....	1,797	7,300	389	1,839	2,597	15
1990.....	1,643	8,230	282	1,623	3,014	19
1991.....	1,867	7,113	268	1,891	2,733	21
1992.....	1,924	5,058	2,500	1,921	2,154	541
Change (1983-87)	-413	-523	-988	+501	+86	-84
Change (1987-92)	-131	-348	+1,880	-655	-36	+495

By requested start date or fiscal year of funds.

Data are from the award rate file, in which amendments replace their initial application if reviewed in the same fiscal year.

2. STUDY SECTION ACTION ON COMPETING R01 APPLICATIONS

NIH review policy changes: Mean priority score trends

Not Recommended for Further Consideration (NRFC) Effects

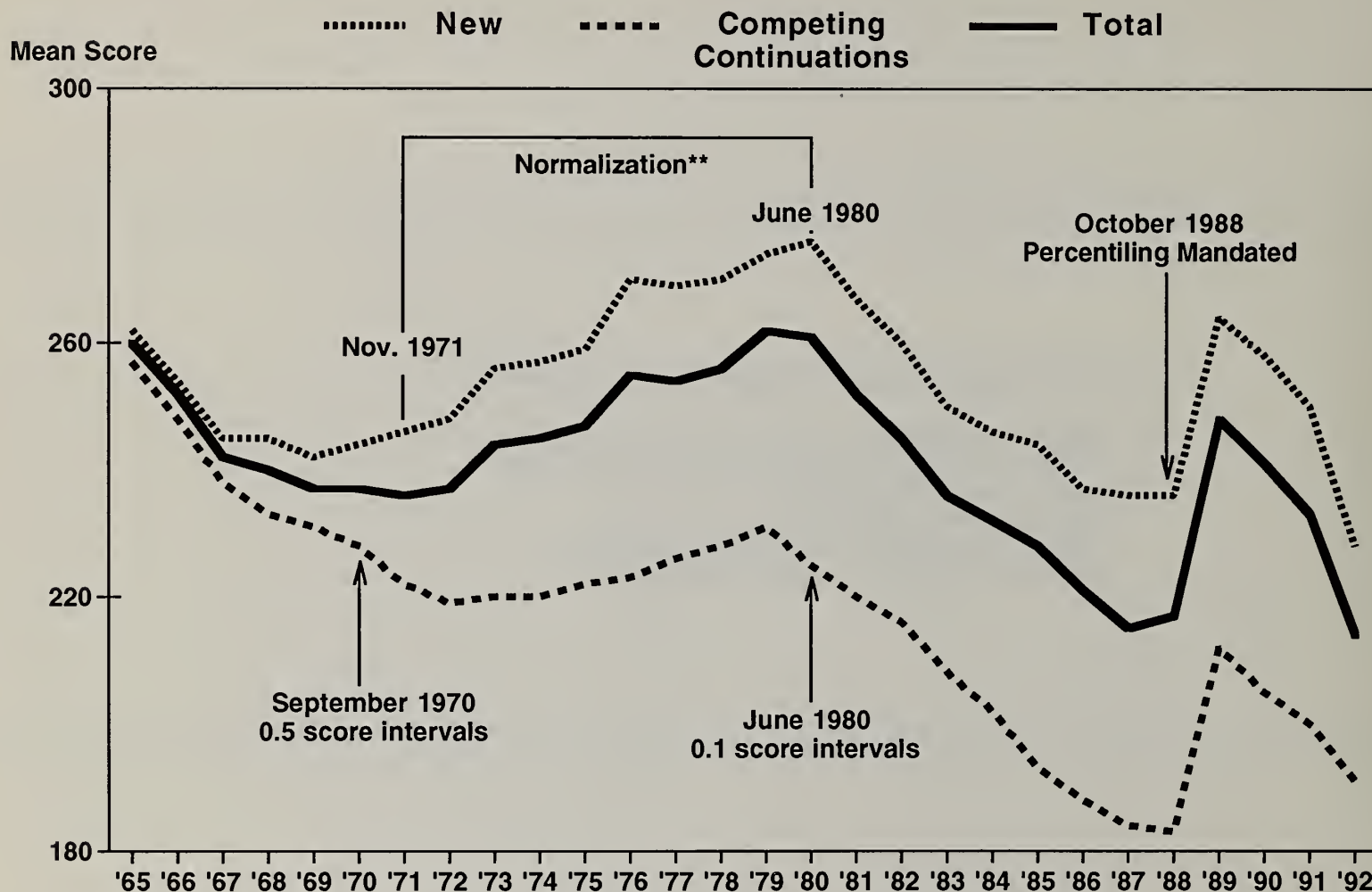
Priority score distribution trends

Shift in frequency distribution of priority scores

Selected grant activities: Mean priority score trends

Requested and IRG-recommended dollar support

Mean Priority Scores of DRG-Rated R01 Applications in Relation to NIH Review Policy Changes, FY1965 - 1992*



* Raw scores summarized by fiscal year of funding or requested start date; 1970-1992 from success rate file.

** Normalization of scores limited to some institutes (AG, AI, CA, EY, HD, HL in 1978).

Source: NIH, DRG, ISB, SAES

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Mean-priority-score trends for R01 applications reviewed by DRG study sections generally fall into five periods: (1) a decline (or shift toward 100) from 1965 to 1970, (2) a steady increase (a shift toward 500) from 1970 to 1980, (3) a rather sharp decline from 1980 to 1987, (4) a sharp upward rebound from 1988 to 1989, and (5) a continued decline from 1989 through 1992. This chart covers a 28-year period. Data from 1970-1992 (but not from previous years) are available from an award rate file that counts each application and its amendments from the same fiscal year as one unit.

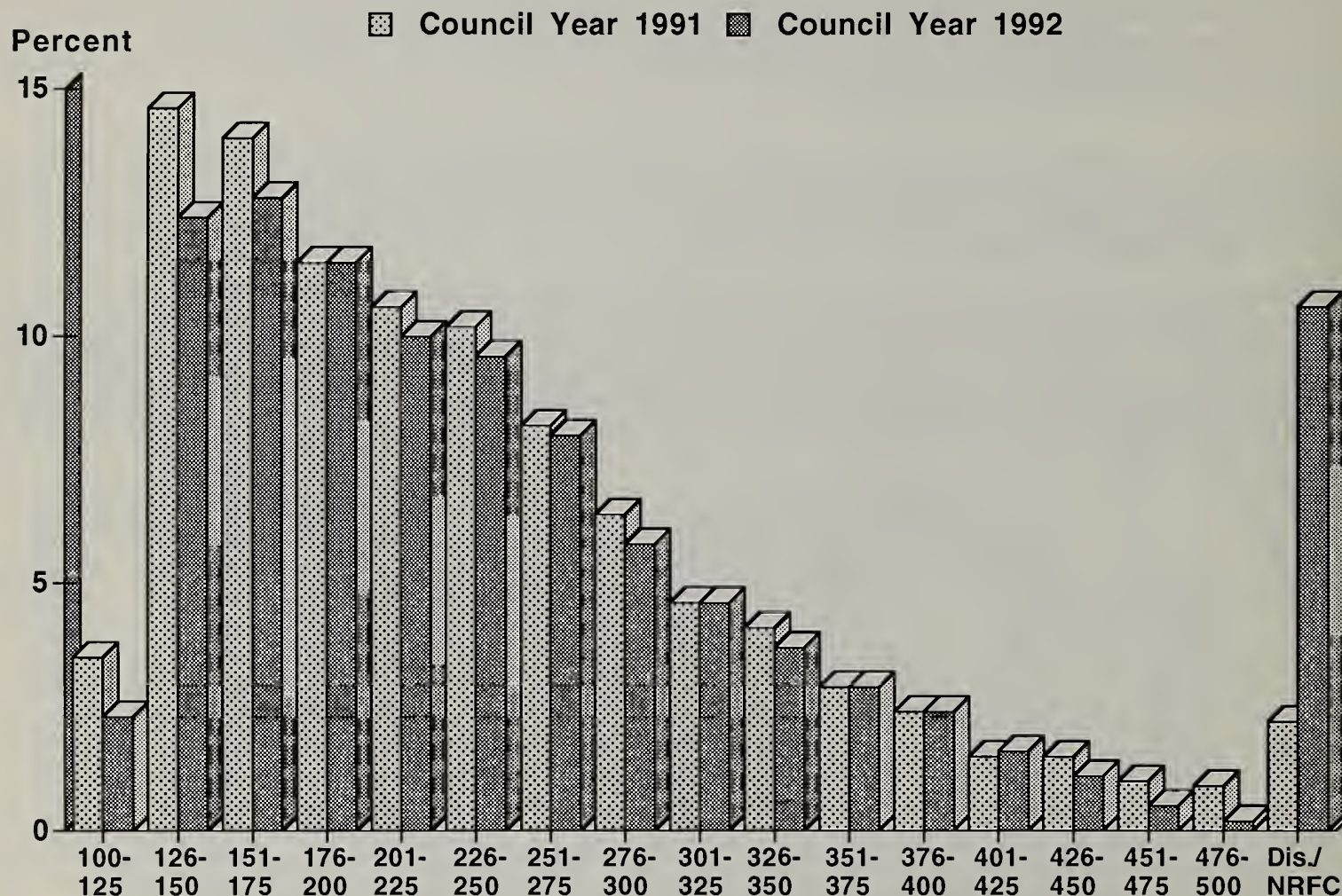
Changes in reviewing procedures can affect mean priority scores. For example, to improve comparability among study sections, DRG computed standardized scores from November 1971 to June 1980, and some Institutes used them in their funding decisions. (Standardized scores were based on a mathematical transformation of raw priority scores for each study section to a distribution with a mean of 250 and a standard deviation of 70.) The upward trend in mean priority scores from 1971 to 1980 is contemporaneous with standardization.

The meanings and effects of being rated (approved) and disapproved, in short, have changed. When funds were plentiful, recommending approval approximated granting funding more closely. As seen in Chapter 1, when funding was in short supply, many approved applications were not funded. With priority scores changing to incorporate disapprovals as scores of 501, the period from 1970-1980 shows an improvement in the mean scores of new R01 applications reviewed by DRG. Competing continuations, with their higher approval rates, showed less of an effect on scores during standardization. Furthermore, the trend toward lower mean priority scores before standardization and since June 1980, suggests that standardization might, in fact, have slowed a long-term trend toward lower mean priority scores.

<u>Year</u>	<u>New Applications</u>			<u>Competing Continuations</u>		
	<u>Approved Mean</u>	<u>Reviewed Mean*</u>	<u>Appr. Rate</u>	<u>Approved Mean</u>	<u>Reviewed Mean*</u>	<u>Appr. Rate</u>
1965.....	262	373	53	257	305	80
1970.....	244	353	57	228	277	82
1975.....	259	336	68	222	252	89
1980.....	276	334	74	225	243	93
1985.....	244	273	89	193	198	98
1988.....	236	252	94	183	186	99
1989.....	264	274	96	212	213	99
1990.....	258	264	97	205	207	99
1991.....	250	257	97	200	201	99
1992.....	228	275	74	191	212	88

*Reviewed mean scores include disapprovals as 501. Summarized by fiscal year of funds or requested start date.

Percent Distribution of DRG-Reviewed R01 Applications by Priority Score Interval, Council Year 1991 Versus Council Year 1992



Source: NIH, DRG, ISB, SAES

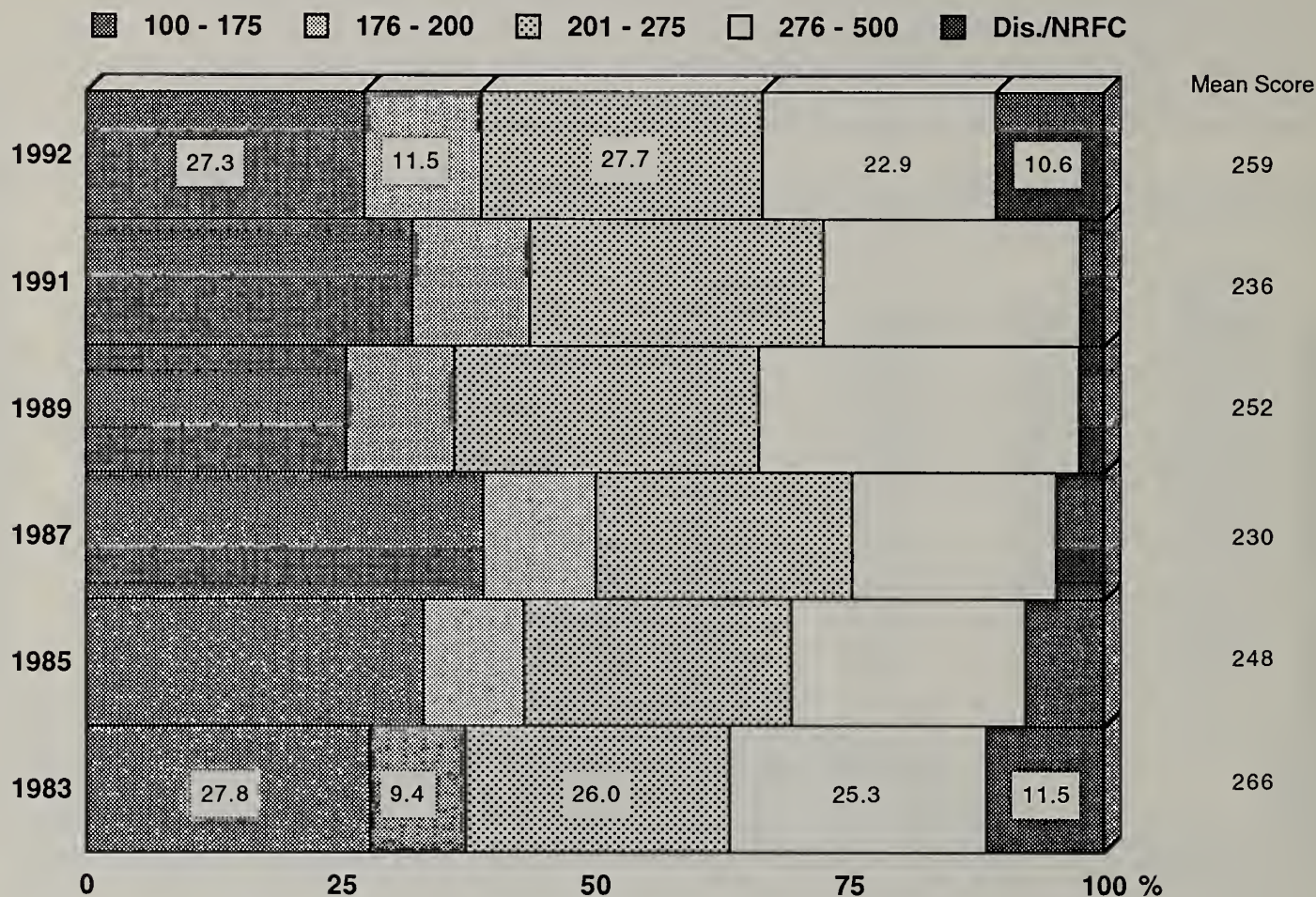
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The chart on page 24 reflects the effects on the priority score distributions of the NRFC conversion. There are two notable features about these data, one obvious and the other subtle. Clearly, the conversion did increase the number and percentage of cases deemed inappropriate for funding (roughly, by a factor of 5, from 2 percent to 10 percent). Note, however, that 2,723 R01 applications reviewed in 1992 got priority scores higher than 300. As the chart and table display, this does not differ very much from the corresponding part of the distribution before the NRFC change. It should be noted, though, that some of the descriptive adjectives and score range pairing were also changed concurrent with the NRFC conversion. These 2,723 R01 applications were at least found to be "acceptable", if not "good".

Secondly, while there seems to be some decline between 1991 and 1992 in the percentage of applications in the "fundable" priority score region of 100-175, the remainder of the two distributions appear to be remarkably similar.

Priority Score Interval	1991			1992		
	Number	Percent	Cumulative Percent	Number	Percent	Cumulative Percent
100-125	516	3.5%	3.5%	367	2.3%	2.3%
126-150	2,144	14.6%	18.1%	1,983	12.4%	14.7%
151-175	2,054	14.0%	32.0%	2,041	12.8%	27.5%
176-200	1,698	11.5%	43.6%	1,839	11.5%	39.0%
201-225	1,554	10.6%	54.1%	1,605	10.0%	49.0%
226-250	1,495	10.2%	64.3%	1,530	9.6%	58.6%
251-275	1,212	8.2%	72.5%	1,273	8.0%	66.5%
276-300	939	6.4%	78.9%	931	5.8%	72.4%
301-325	676	4.6%	83.5%	733	4.6%	77.0%
326-350	605	4.1%	87.6%	594	3.7%	80.7%
351-375	425	2.9%	90.5%	464	2.9%	83.6%
376-400	354	2.4%	92.9%	384	2.4%	86.0%
401-425	215	1.5%	94.4%	263	1.6%	87.6%
426-450	217	1.5%	95.8%	182	1.1%	88.8%
451-475	151	1.0%	96.9%	75	0.5%	89.2%
476-500	130	0.9%	97.8%	28	0.2%	89.4%
Disapp/NRFC	331	2.2%	100.0%	1,695	10.6%	100.0%
Total	14,716	100.0%		15,987	100.0%	

Distribution of R01 Applications* Rated by DRG Study Sections by Priority Score Interval**, FY1983-1992†



* Original and amended applications summarized by fiscal year of initial review; excludes withdrawals and supplements.

**Uneven score intervals.

† Selected years.

Source: NIH, DRG, ISB, SAES

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A major trend in the review of R01 applications has been the increase in favorable priority scores. The proportion of R01 applications with scores of 100 to 175 showed a steady annual increase from 1983 through 1988. To curtail this trend, NIH instituted percentiling and a standard set of adjectives to be used by IRG's. As a result, mean priority scores rose sharply in 1989, but began to shift toward 100 again in 1990. Applications receiving scores between 100 and 175 increased by 11.2 percentage points as shown in the table below, from 27.8 percent of approvals in 1983 to 39.0 percent in 1987. By 1989, however, only 25.5 percent of scores were in the best priority-score range. And, by 1992, this number had increased to 27.3 percent.

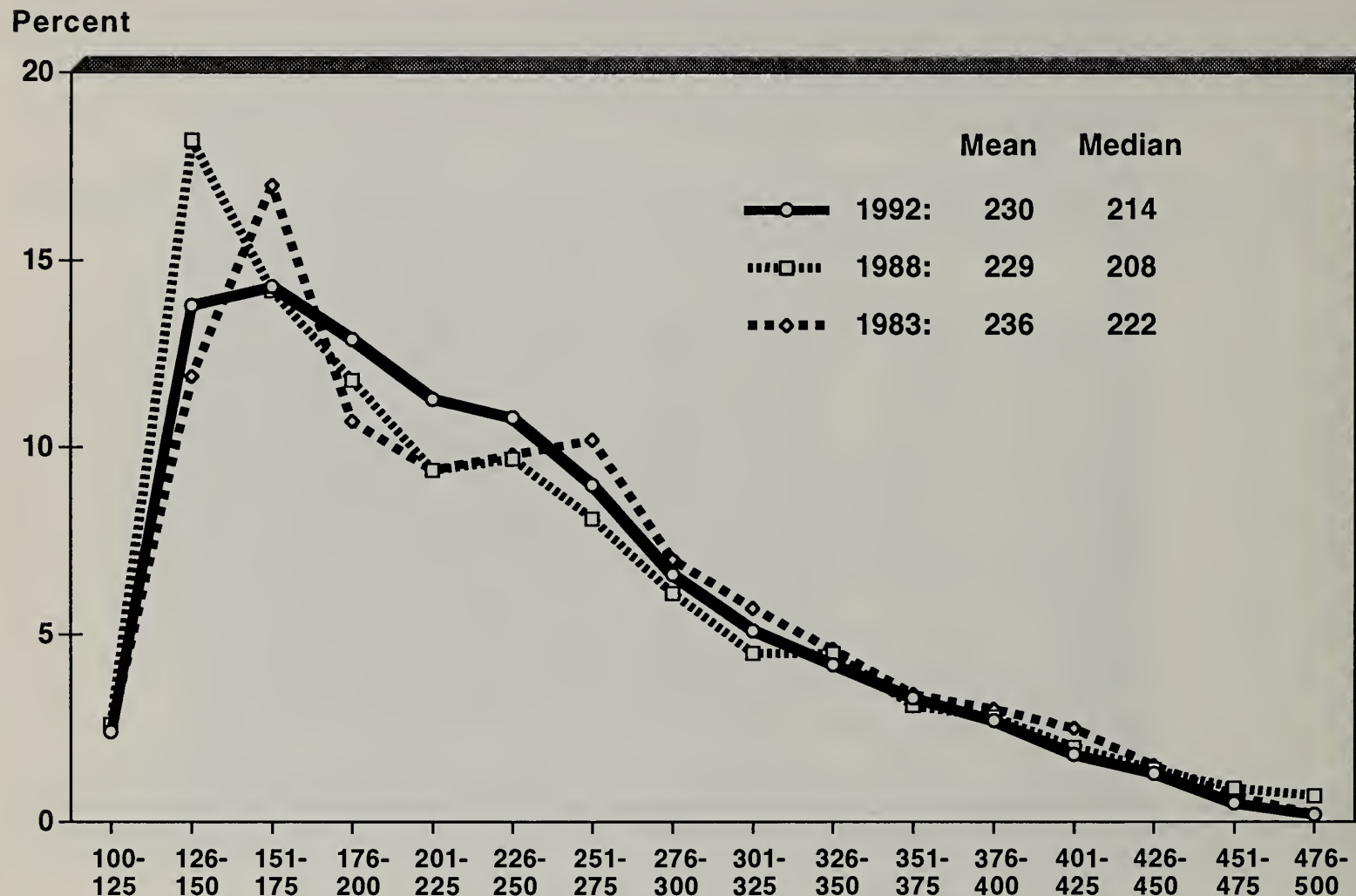
These shifts were not confined to particular priority-score intervals. Rather, there was a general improvement across the total range of scores, with a declining proportion of applications in the poorest score intervals as well as in the intermediate range. Applications in the poorer half of the rating scale (scores 301 to 500) declined by 2.1 points, from 19.1 percent in 1983 to 17.0 percent by 1992.

<u>Scores</u>	<u>1983</u>	<u>1985</u>	<u>1987</u>	<u>1989</u>	<u>1991</u>	<u>1992</u>	<u>1983-92</u>
100-125.....	2.1	2.6	3.6	1.6	3.3	2.1	0.0
126-150.....	10.6	16.0	20.7	10.1	14.6	12.3	+1.8
151-175.....	15.1	14.4	14.7	13.8	14.0	12.8	-2.3
176-200.....	9.4	9.9	11.1	10.7	11.6	11.5	+2.1
201-225.....	8.3	8.9	9.3	10.2	10.6	10.1	+1.8
226-250.....	8.7	9.6	9.0	10.6	10.2	9.6	+0.9
251-275.....	9.0	7.9	6.9	9.1	8.2	8.0	-1.0
276-300.....	6.2	5.8	5.4	7.8	6.4	5.9	-0.3
301-400.....	14.8	12.9	10.8	17.7	14.0	13.6	-1.2
401-500.....	4.3	4.2	3.8	6.1	4.9	3.4	-0.9
Dis./NRFC...	11.5	7.7	4.7	2.4	2.3	10.6	-0.9
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	
Number....	14,931	16,418	13,278	15,871	14,850	15,990	

(Due to rounding, some totals may only approximate 100.0.)

To permit more precise evaluation of applications, NIH allowed ratings in 0.5 intervals beginning September 1970 and in 0.1 intervals beginning June 1980. Although this change can uncover small differences in the relative position of individual applications, it cannot change overall score trends directly.

Priority-Score Distributions of Competing R01 Applications Rated by DRG Study Sections, FY1983, 1988, 1992*



*Summarized by fiscal year of initial review; excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

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All three of these distributions exhibit approximately the same positive skew. The principal change between 1983 and 1988 in R01 score distributions was an increase in the range 126 to 150 -- up 6.3 percentage points from 11.9 to 18.2 percent. This would be consistent with the lowest (best) priority score period in history (cf. pages 22f.).

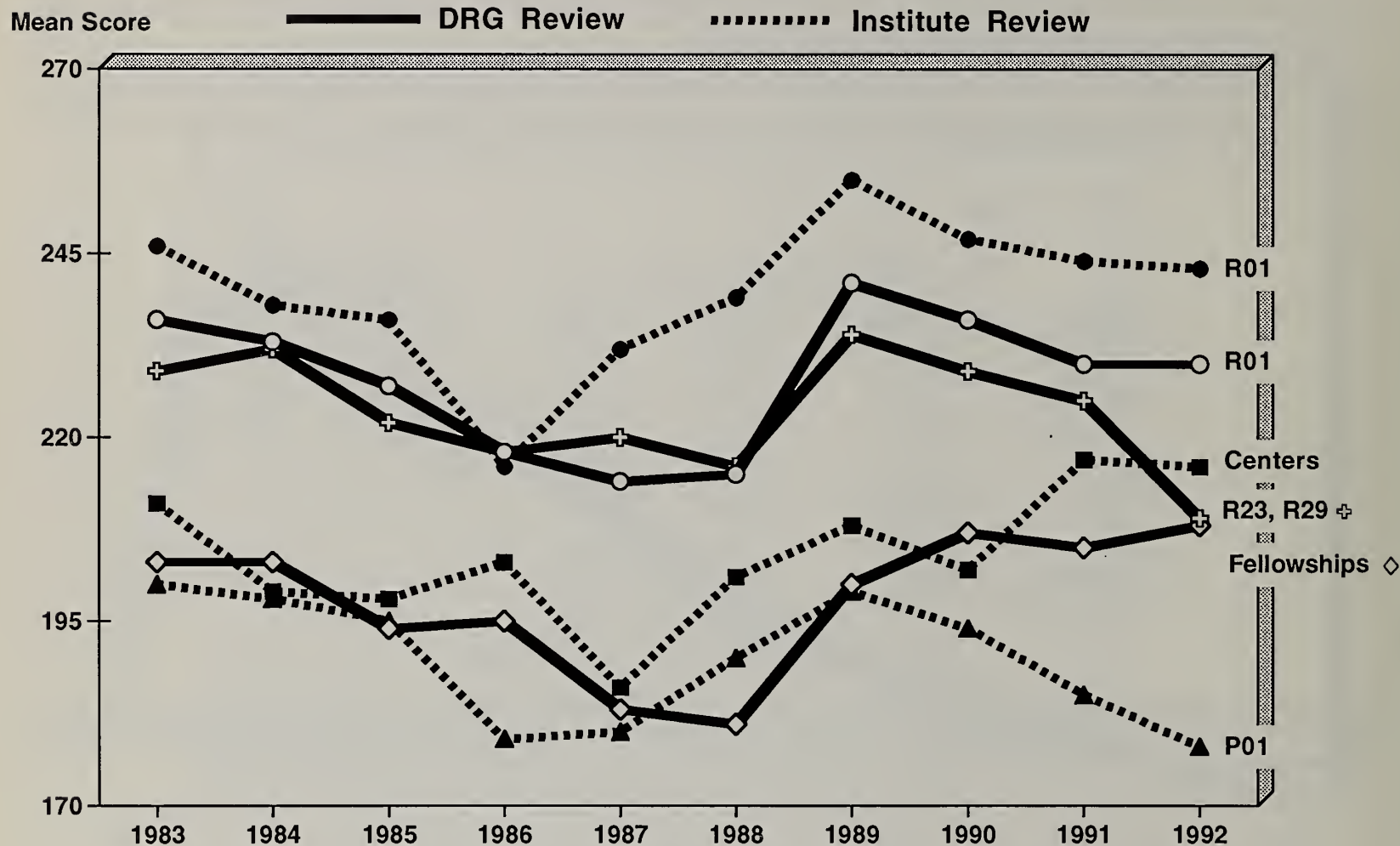
The shift toward priority scores of 175 or better from 1983 to 1988 is clear in these distributions. The largest change was in scores of 126 to 175. Cumulatively, the percentage of scores under 175 grew from 29.0 percent to 35.0 percent. But by 1992, this trend had reversed; scores from 126 to 175 declined by 4.3 percentage points and made up 28.1 percent of rated applications.

<u>Scores</u>	<u>Score Distribution</u>			<u>Percentage Point Change</u>	
	<u>1983</u>	<u>1988</u>	<u>1992</u>	<u>1983-88</u>	<u>1988-92</u>
100-125.....	2.4%	2.6%	2.4%	+0.2	-0.2
126-150.....	11.9	18.2	13.8	+6.3	-4.4
151-175.....	17.0	14.2	14.3	-2.8	+0.1
176-300.....	47.0	45.1	50.5	-2.0	+5.4
>300.....	21.7	19.9	19.0	-1.7	-0.9
Total.....	100.0	100.0	100.0		
Number*.....	13,208	13,367	14,293		
Mean.....	236	229	230		
Std. Dev. ...	82.8	86.1	79.7		
Coeff. Var...	35.1%	37.6%	34.7%		

*Rated applications by fiscal year of IRG review.

The standard deviation of scores declined from 82.8 in 1983 to 79.7 in 1992, showing a decline in variability of priority scores. As scores edge toward their limit of 100, the coefficient of variation may provide a more meaningful measure of relative change in the variability or dispersion of scores. It has remained relatively constant, despite the changes in the means and standard deviations.

Mean Priority Scores of Competing Applications for Selected Grant Activities, FY1983-1992*



*Summarized by fiscal year of initial review; excludes withdrawals and deferrals.
Source: NIH, DRG, ISB, SAES

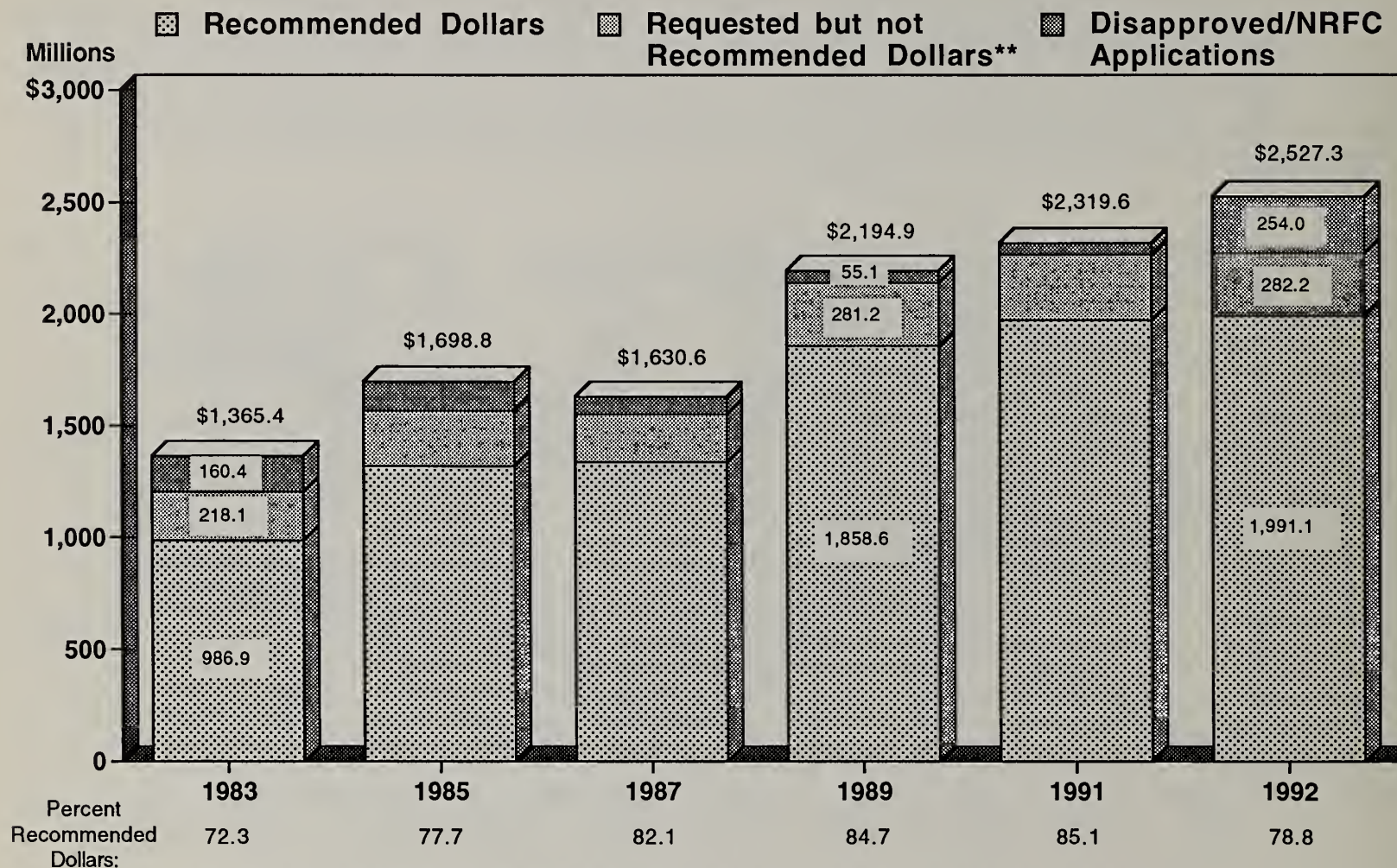
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The decline in mean priority scores from 1983 to 1988 is not unique to R01 applications reviewed by DRG study sections. A comparable trend is found in New Investigator Research Awards (R23, or later, R29) and Fellowships, as well as in applications reviewed by Institute review groups such as Research Centers and Research Program Projects (P01's). These separate trends also generally echo the 1988 to 1989 rise in scores, followed by the decline from 1990 through 1992. Score declines from 1983 to 1988 ranged from as few as 7 points for R01's reviewed by Institutes to 32 points for Fellowships. Institute-reviewed R01's began receiving the highest average scores (i.e., closer to 500) in 1987, and this pattern has continued through 1992, although their means did decline slightly. Fellowships (DRG-reviewed) and Centers (Institute-reviewed) did depart from the 1989 through 1992 decrease shown by other mechanisms.

<u>Year</u>	<u>DRG Review</u>			<u>Institute Review</u>		
	<u>R01</u>	<u>R23,R29</u>	<u>Fellowships</u>	<u>R01</u>	<u>P01</u>	<u>Centers</u>
1983.....	236	229	203	246	200	211
1984.....	233	232	203	238	198	199
1985.....	227	222	194	236	195	198
1986.....	218	218	195	216	179	203
1987.....	217	220	183	232	180	186
1988.....	215	216	181	239	190	201
1989.....	245	234	200	255	199	208
1990.....	236	229	207	247	194	202
1991.....	230	225	205	244	185	217
1992.....	230	209	208	243	178	216
Change (1983-92).....	-6	-20	5	-3	-22	5

Summarized by fiscal year of IRG review.

Requested and IRG-Recommended Dollar Support on Competing R01 Applications* Reviewed by DRG Study Sections, FY1983-1992†



*First year of requested support summarized by fiscal year of initial review. Excludes withdrawals and supplements.

**Dollar reduction in recommended applications.

†Selected years.

Source: NIH, DRG, ISB, SAES

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The amount of first-year support requested in R01 applications reviewed by DRG study sections nearly doubled in ten years, from approximately \$1.4 billion in 1983 to over \$2.5 billion in 1992.

Rating (previously known as approval) of R01 applications increased from 88.5 percent in 1983 to a high of 98.1 in 1990. With the implementation of the NRFC classification in 1992, the percent rated fell to 89.4. Total recommended first-year direct-cost dollar support, however, was considerably lower -- 72.3 percent in 1983 increasing to 85.1 percent in 1991 and then dropping sharply in 1992. Initial review groups are recommending fewer cuts in applicants' requested support amounts: cuts in rated projects' budgets are down by 5.6 percentage points from 1983 through 1992.

	<u>Amount Requested</u>			<u>No. of Applications</u>		
	<u>1983</u>	<u>1988</u>	<u>1992</u>	<u>1983</u>	<u>1988</u>	<u>1992</u>
Rated.....	72.3	83.5	78.8	88.5	91.4	89.4
Total Disapproved.....	27.7	16.5	21.2	11.5	8.6	10.6
Disapprovals (NRFC)...	11.5	3.9	10.6	11.5	8.6	10.6
\$ Reduction.....	16.2	12.6	10.6	-	-	-
 Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Amount*	\$1,365.4	1,789.6	2,527.3	\$14,928	13,942	16,013

Recommended dollar reduction was somewhat greater on competing continuations than on new applications until 1992; generally speaking, however, this reduction was more than offset by an extremely high proportion of competing continuation applications which were rated. Additionally, the impact of the NRFC classification was greater upon new applications than competing continuations.

	<u>Percentages</u>					
	<u>New Applications</u>			<u>Competing Continuations</u>		
	<u>1983</u>	<u>1988</u>	<u>1992</u>	<u>1983</u>	<u>1988</u>	<u>1992</u>
Rated.....	68.8	81.8	75.7	79.2	86.1	84.3
Total Disapproved.....	31.2	18.2	24.3	20.8	13.9	15.7
Disapprovals (NRFC)...	15.1	5.9	17.9	3.0	0.7	4.3
\$ Reduction.....	16.1	12.3	6.4	17.8	13.2	11.4
 Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Amount*	\$912.5	1,102.4	1,631.2	\$452.9	687.2	896.1

*First-year request in millions of dollars. Summarized by fiscal year of IRG review.

3. APPLICATION CHARACTERISTICS (R01) RELATED TO STUDY SECTION ACTION

Application Type: New, competing continuation

Study section actions: Disapproval/NRFC, score distributions

Trends in mean priority scores: Amended, non-amended, success rates

Requested years of support

Distribution of applications by requested years

Requested versus approved years of support

Trends in mean priority scores by requested years

Study section actions: Disapproval/NRFC, score distributions

Frequency distributions of priority scores

Institute assignment

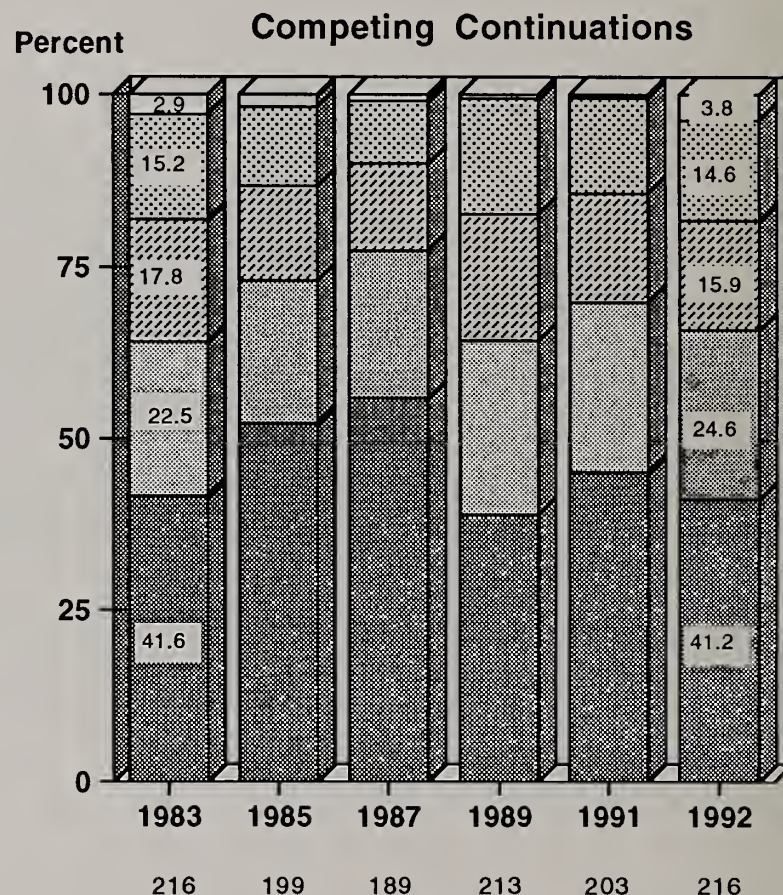
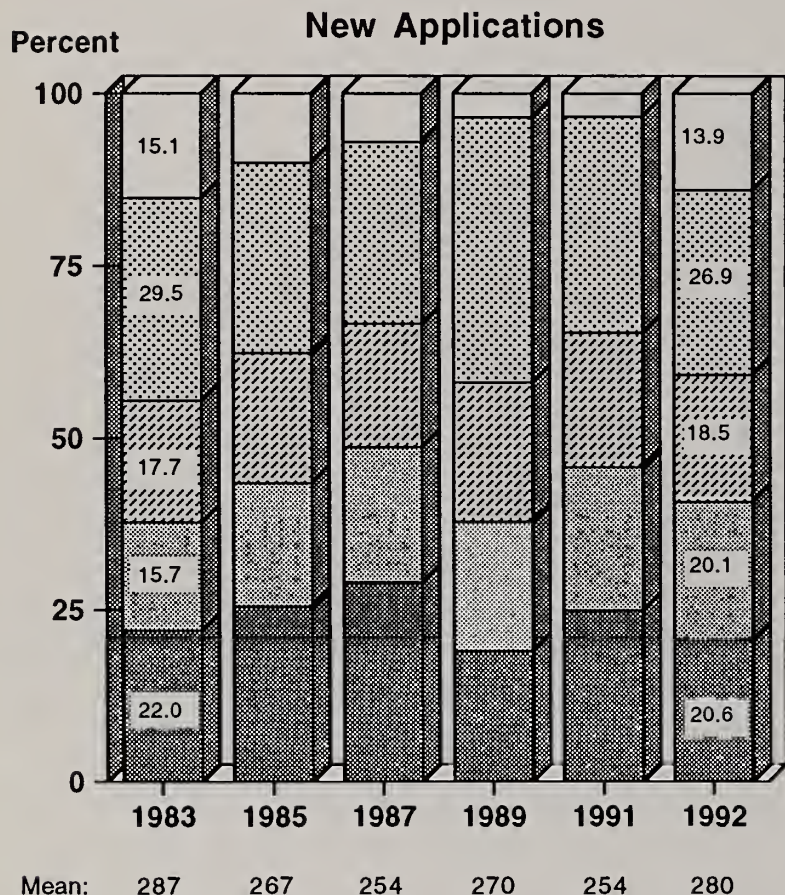
Number of applications

Study section actions: Disapproval/NRFC, score distributions

Difference in mean priority scores, FY1983 - 1992

Competing R01 Applications* Reviewed by DRG Study Sections by Priority Score Interval and Type, FY1983-1992†

100-175
 176-225
 226-275
 276-500
 Disapproved/
NRFC**



* Original and amended applications summarized by fiscal year of initial review; excludes withdrawals and supplements.

**Beginning with FY1992, "not recommended for further consideration (NRFC)" was used and the category "disapproved" was dropped.

† Selected years.

Source: NIH, DRG, ISB, SAES

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The proportion of new and competing continuation R01 applications disapproved by DRG study sections declined from FY1983 to FY1991. The number of applications not rated rose again with the advent of the NRFC classification. The proportion of disapproved new applications fell by 11.9 percentage points from 1983 to 1991. Competing continuations, all of which have won funding in a previous round, had 2.4 percent fewer disapprovals between 1983 and 1991. In 1991, only 0.5 percent of applications for competing continuation were disapproved, while 3.2 percent of new applications were disapproved.

From 1983 to 1987, the proportion of both new and competing continuation applications scoring 100-175 rose steadily. Through 1987, R01 competing continuations showed an especially large increase in the proportion with these scores -- a 14.3 percentage point increase, compared to an increase of 7 points on new applications. Competing continuations have won funding previously, and can be expected to have a high proportion of good scores. Not surprisingly, competing continuation trends correspond to the trends seen in the last chapter for R01 applications: proportions in the good range increased through 1987, dropped in 1988 and 1989, and showed growth through 1991. Mean priority scores also mirror this trend.

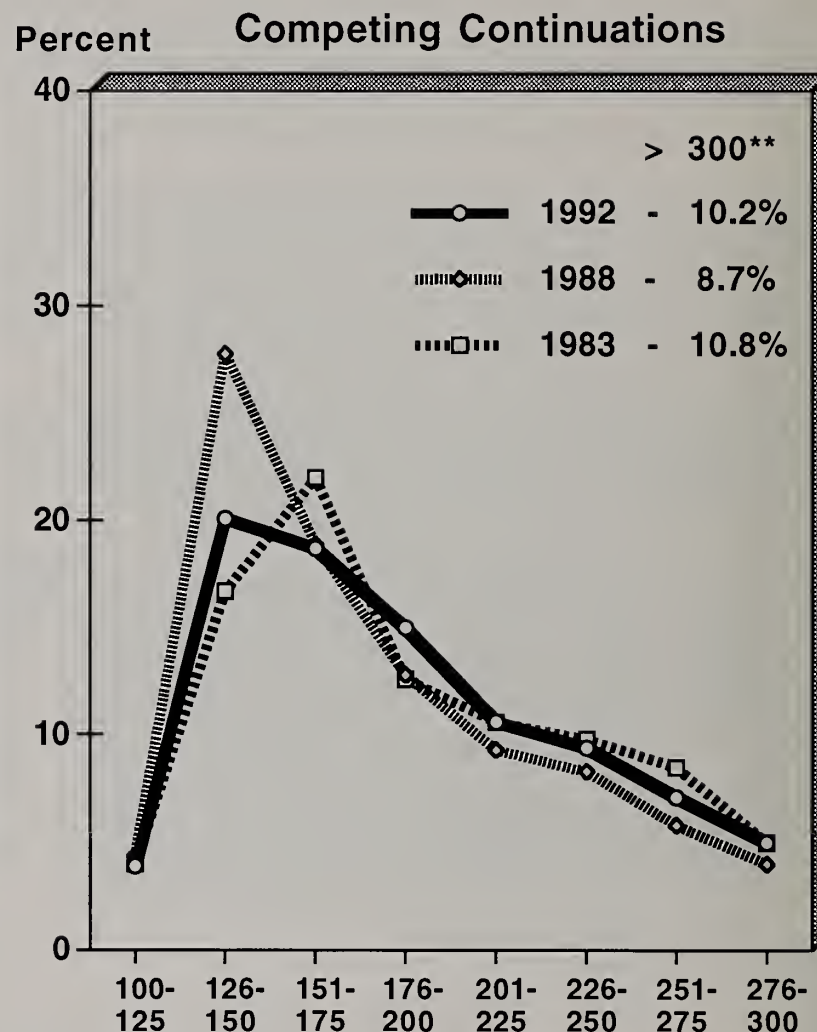
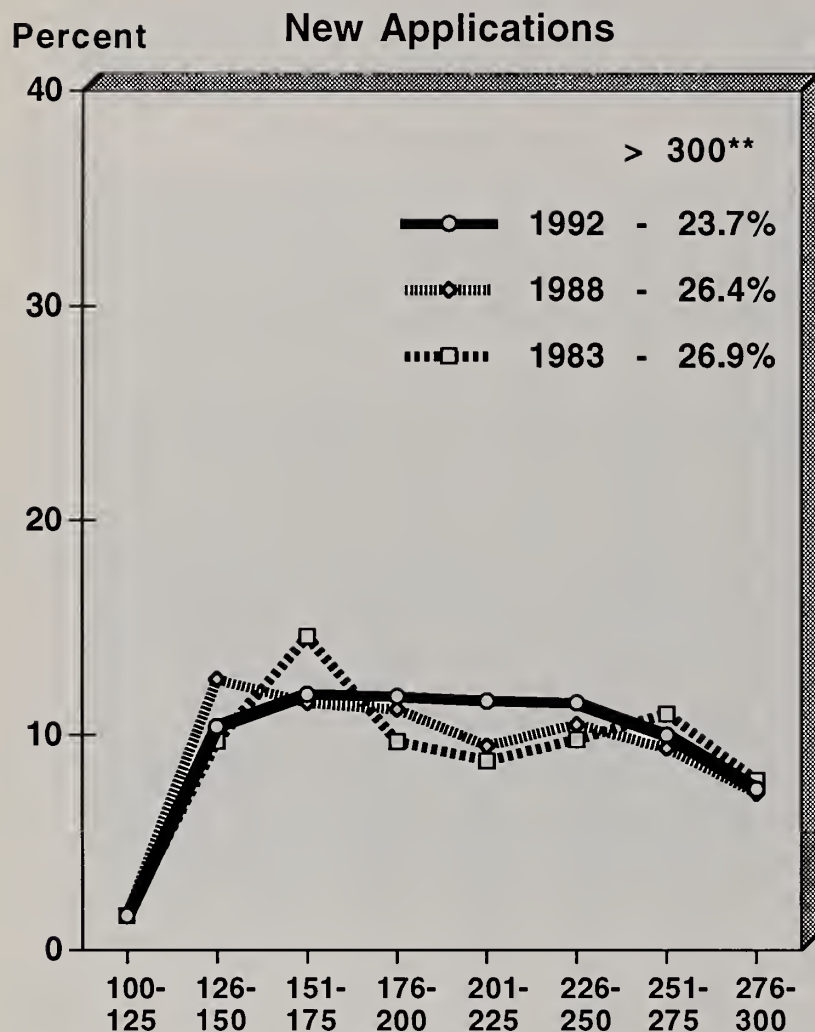
Please note that the reviewed mean priority scores, unlike the statistics based only on approved applications, include disapprovals as if they had a priority score of 501. In combination with the effects of the NRFC change shown elsewhere, this probably accounts for the 26-point rise in mean priority scores for new applications in 1992.

	Number Reviewed		Percentage Disapproved (NRFC)		Percentage 100-175		Reviewed ** Mean score		Approved Mean score		Approved Median score	
	Competing		Competing		Competing		Competing		Competing		Competing	
	New	Cont.	New	Cont.	New	Cont.	New	Cont.	New	Cont.	New	Cont.
1983.....	10,549	4,382	15.1	2.9	22.0	41.6	287	216	249	208	241	189
1984.....	11,123	4,498	13.7	2.3	22.9	48.1	282	208	247	201	236	177
1985.....	11,736	4,682	10.0	1.8	25.5	52.2	267	199	241	194	229	170
1986.....	10,019	5,250	7.9	0.9	28.5	55.5	256	190	235	188	221	166
1987.....	8,648	5,080	7.0	0.9	29.0	55.9	254	189	235	187	219	165
1988.....	8,953	4,928	5.4	0.7	24.3	50.7	262	198	248	196	235	174
1989.....	10,746	5,125	3.3	0.5	19.0	38.9	270	213	262	211	250	195
1990.....	10,872	5,103	2.7	0.3	22.4	43.6	259	205	252	204	238	187
1991.....	9,674	5,176	3.2	0.5	24.9	45.1	254	203	246	201	232	184
1992.....	10,798	5,192	13.9	3.8	20.6	41.2	280	216	244	205	232	187
Change (1983-88)												
	-1,596	+546	-9.7	-2.2	+2.3	+9.2	-25	-19	-1	-12	-6	-15
Change (1988-93)												
	+1,845	+264	8.5	3.1	-3.7	-9.5	+18	+18	-4	+11	-3	+13

*Percentage of reviewed applications by fiscal year of IRG review.

**Includes disapprovals as if they had a priority score of 501.

Priority-Score Distributions of Competing R01 Applications* Rated by DRG Study Sections, FY1983, 1988, 1992



*Summarized by fiscal year of initial review; excludes withdrawals and supplements.

**Distribution of scores over 300 not shown.

Source: NIH, DRG, ISB, SAES

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While the general shapes of the DRG-reviewed, new R01 application priority score distributions from 1983, 1988, and 1992 are very similar, they differ markedly from their corresponding competing continuation R01 priority score distributions. Consistent with the percentile score distributions seen elsewhere, competing continuation applications are much more likely to have received lower (better) scores.

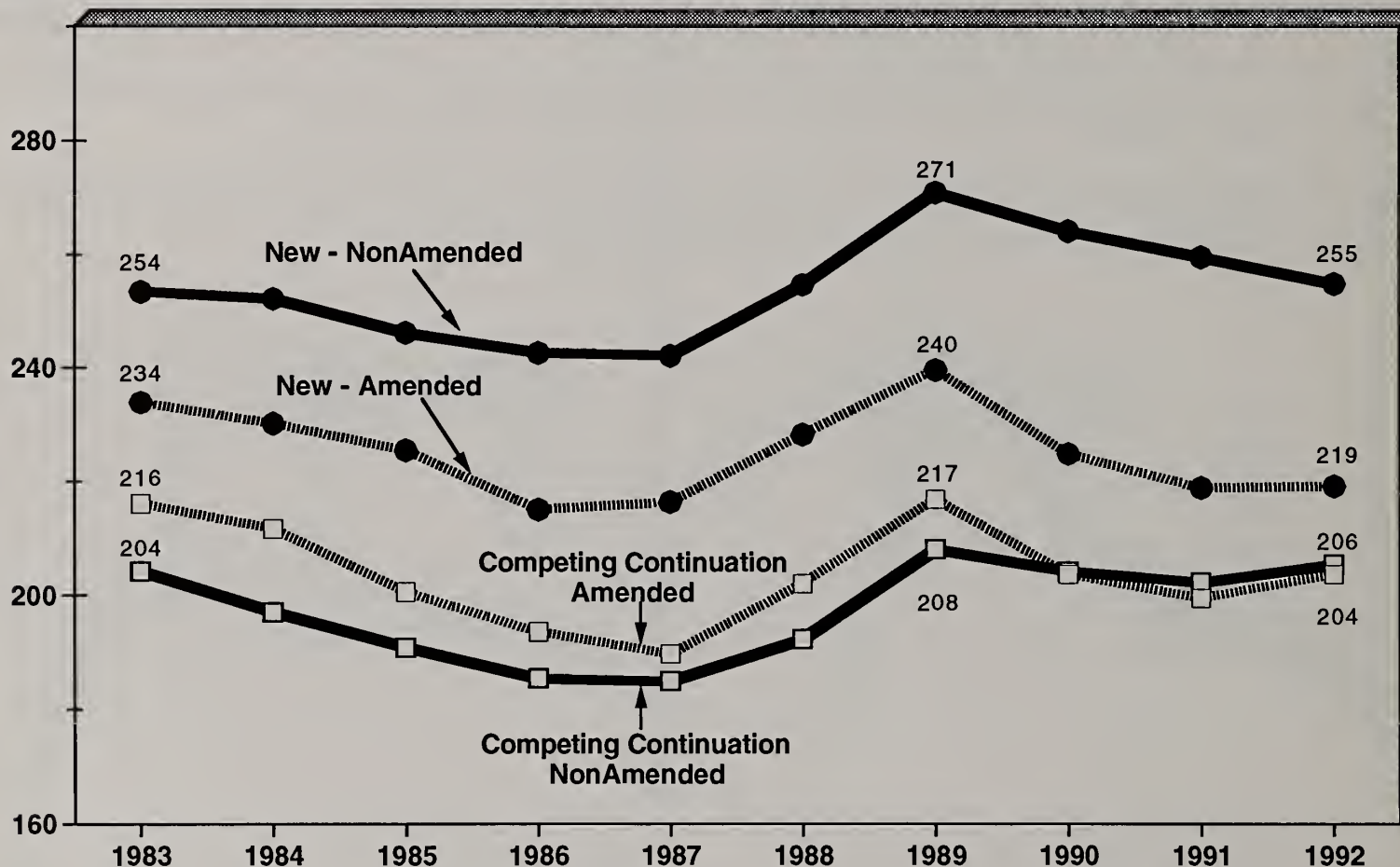
From 1983 to 1987, mean priority scores of DRG-reviewed amended new and competing continuation R01 applications declined (i.e., were rated more favorably). In part, this was probably due to the amendment of high-scoring applications that, in earlier years, would have been funded. In 1989, all priority scores, amended or not, rose. Most likely, this reflects percentiling, standardized adjectives with score ranges, and encouragement of greater score dispersion. By 1992, scores had once again declined.

Initially, amended competing continuations had poorer average scores than nonamended competing continuations; this gap, however, slightly narrowed and reversed. Since 1983, mean scores of competing continuations without amendments increased (worsened) by 2 points, but scores of competing continuations with amendments declined by 12 points.

<u>New Applications</u>			<u>Competing Continuations</u>			
	<u>Excluding</u>	<u>Including</u>		<u>Excluding</u>	<u>Including</u>	
	<u>Amendments</u>	<u>Amendments</u>	<u>Diff.</u>	<u>Amendments</u>	<u>Amendments</u>	
1983.....	254	234	-20	204	216	+12
1985.....	246	226	-20	191	201	+10
1987.....	242	217	-25	185	190	+5
1989.....	271	240	-31	208	217	+9
1991.....	260	219	-41	202	200	-2
1992.....	255	219	-36	206	204	-2
Change (1983-89)	+17	+6		+4	+1	
Change (1989-92)	-16	-21		-2	-13	

Mean Priority Scores of Competing R01 Applications* Rated by DRG Study Sections, FY1983-1992

Mean Score



*Summarized by fiscal year of initial review; excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

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Scores in the 100-175 range declined slightly for new R01 applications, and remained steady for competing continuation R01's between 1983 and 1992. As the chart suggests, though, there was a peak in 1989 for all applications yielding a smaller proportion in the 100-175 range. For instance, the proportion of new applications with 126-150 scores dropped from 9.7 percent in 1983 to 7.4 in 1989 and rose to 10.4 percent in 1992. In parallel, new applications with 151-175 scores dropped from 14.6 to 11.2 and rose slightly to 11.9 percent in 1992. Competing continuation applications with 126-150 scores also declined a little from 16.7 in 1983 to 16.4 percent in 1989 and rose to 20.1 percent in 1992. Similarly, competing continuations with 151-175 scores declined from 22.0 in 1983 to 20.0 percent in 1989, but also dropped to 18.7 percent by 1992. As seen elsewhere, these data continue to reflect the preponderance of competing continuation R01 applications in the score region below 150.

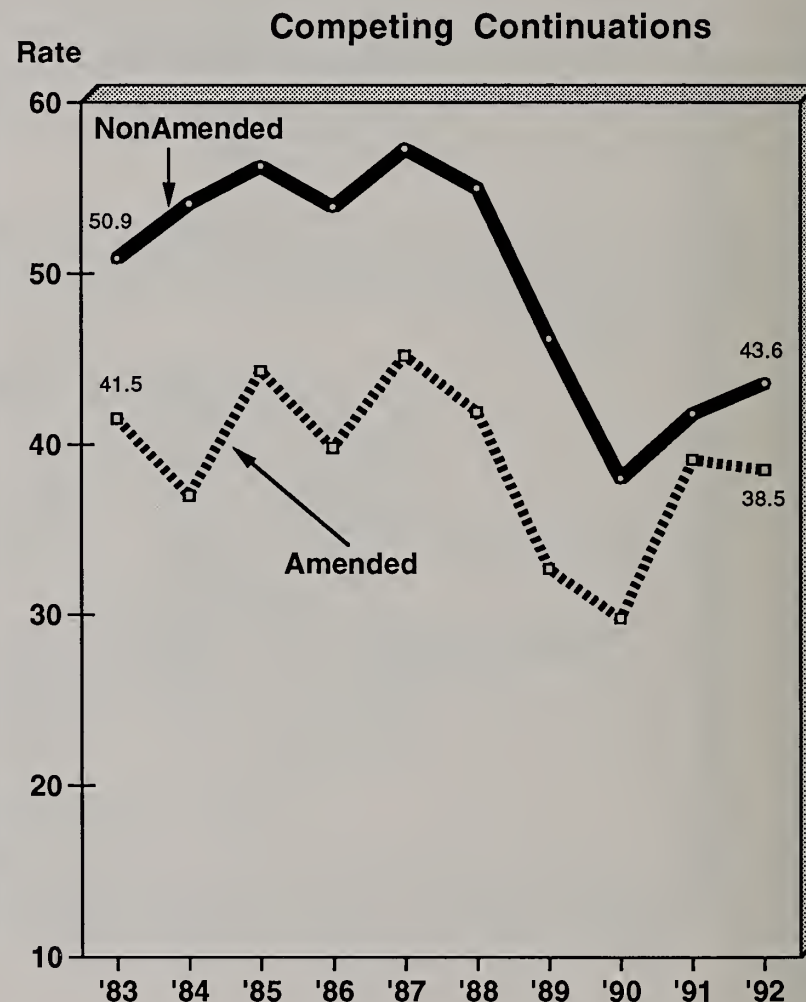
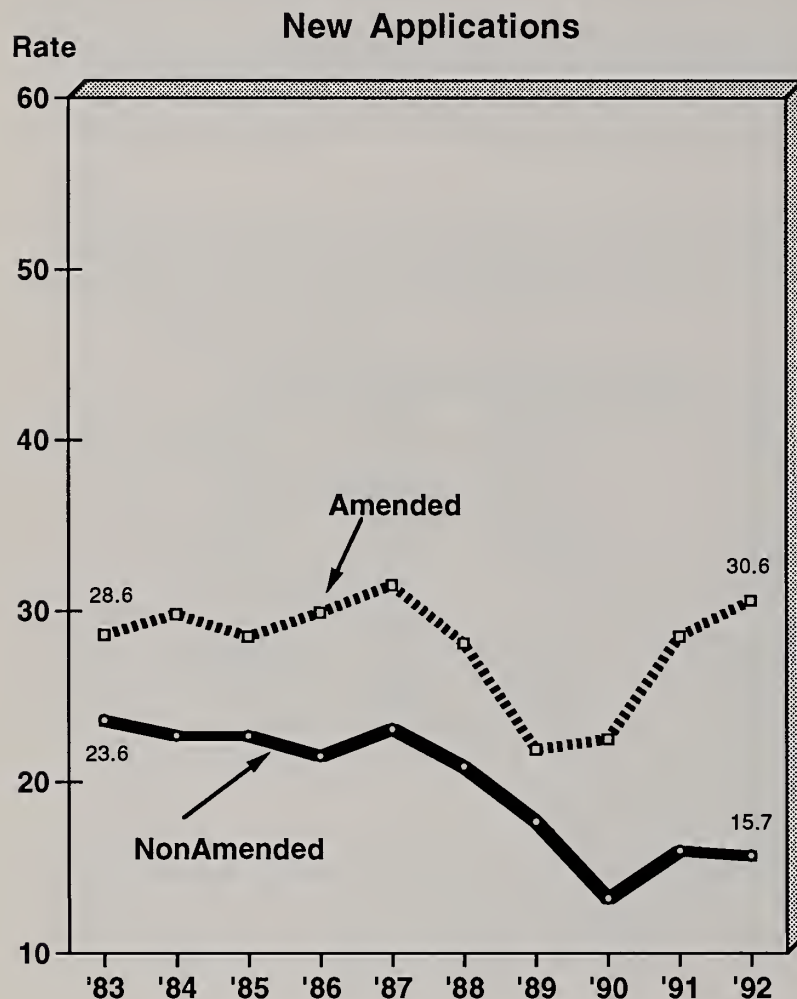
From 1983 to 1992 there were some changes in the proportion of applications with poorer scores (greater than 300). These changes were the converse of those in the better score regions; i.e., in 1989, their percentage rose (roughly 31 percent for new applications, 11 percent for competing continuations). But by 1992, both new applications and competing continuations were showing smaller percentages in the poorer score region.

<u>Scores</u>	<u>New Applications</u>			<u>Competing continuations</u>		
	<u>1983</u>	<u>1989</u>	<u>1992</u>	<u>1983</u>	<u>1989</u>	<u>1992</u>
100-125...	1.6	1.1	1.6	4.0	2.7	3.9
126-150...	9.7	7.4	10.4	16.7	16.4	20.1
151-175...	14.6	11.2	11.9	22.0	20.0	18.7
176-300...	47.2	49.5	52.3	46.6	49.9	47.0
>300...	26.9	30.8	23.8	10.7	11.0	10.3
Total..	100.0	100.0	100.0	100.0	100.0	100.0
No. *	8,955	10,388	10,798	4,253	5,098	4,997
Mean.....	249	262	244	208	211	205
Median....	241	250	232	189	195	187
Std. Dev..	85.4	89.0	81.9	69.1	69.1	68.6
Coeff.Var.	34.3	34.0	33.6	33.2	32.7	33.5

*Approved applications by fiscal year of IRG review.

The dispersion of scores about the mean as measured by the standard deviation has decreased since 1983; however, there is little change if score variability is expressed as a percentage of the mean (coefficient of variation or C.V.).

Success Rates for DRG-Reviewed Competing R01 Applications* by Type and Amendment Status, FY1983-1992



*Competing applications summarized by requested start date or fiscal year of funds from the success rate file.
Source: NIH, DRG, ISB, SAES

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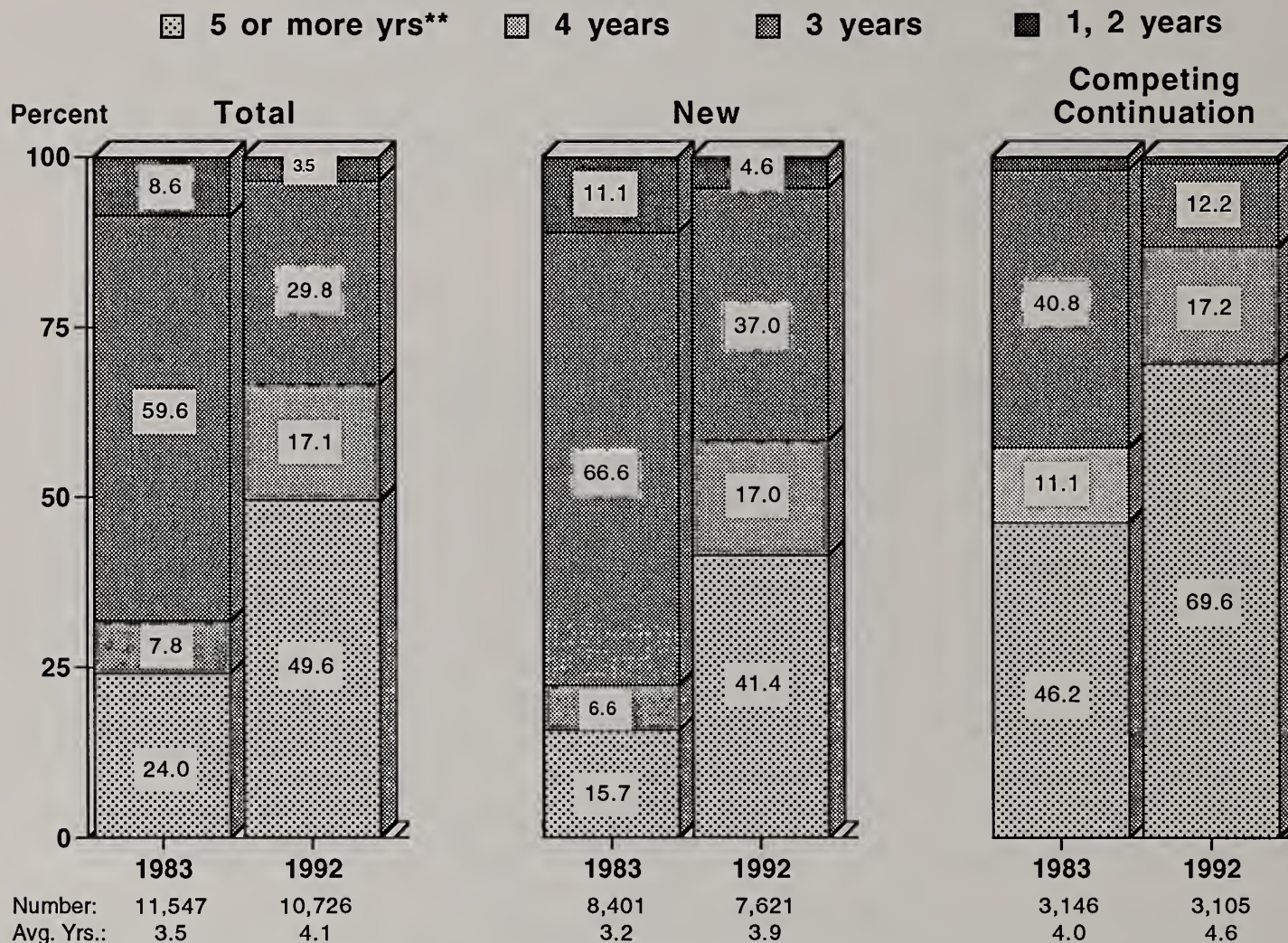
In parallel with the impact of amendments on mean priority scores, the funding prospects for amended applications are historically consistent. It is, however, inappropriate to infer that amended applications are always the most successful in receiving awards. As the graph and table suggest, the success rate of competing continuations has consistently been higher than that of new applications. It is *nonamended* competing continuations which enjoy the greatest prospects for funding while *nonamended* new applications suffer the poorest prospects. These data also suggest that those submitting amended new applications will probably improve their chances of funding, but that two amended submissions is a limit of effectiveness. (New applications with more than two amendments are still, however, more successful than unamended new applications.) Those submitting amended competing continuations will be more likely to receive funding than amended new applications, but will remain less successful than nonamended competing continuations.

Success Rates

Year	NonAmended		One Amendment		Two Amendments		More than Two Amendments	
	New	Competing Continuation	New	Competing Continuation	New	Competing Continuation	New	Competing Continuation
1983	23.6	50.9	29.2	41.9	25.2	38.7	25.6*	46.2*
1984	22.7	54.1	30.1	37.7	28.0	36.2	32.1	20.7*
1985	22.7	56.3	28.7	46.3	27.0	40.2	30.2	24.0
1986	21.5	53.9	29.3	40.4	33.5	37.9	27.9	35.2
1987	23.1	57.3	30.4	45.9	35.1	43.6	37.9	39.1
1988	20.9	55.0	27.3	42.8	31.1	41.5	30.4	31.3
1989	17.7	46.2	21.2	33.1	25.6	34.2	20.2	23.2
1990	13.2	38.0	21.2	29.7	27.4	31.8	23.3	24.6
1991	16.0	41.8	27.3	36.7	32.0	45.3	31.4	39.7
1992	15.7	43.6	29.1	39.1	35.1	36.6	32.8	38.8

*Rate based on fewer than 50 observations.

Distribution of DRG-Reviewed Competing R01 Applications* by Requested Years of Support, FY1983 and FY1992



*Summarized by fiscal year of initial review; excludes amendments, withdrawals and supplements.

**Includes less than 2% requesting 6 or more years.

Source: NIH, DRG, ISB, SAES

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Since 1983, the primary change in the requested years of support for R01 applications has been a decline in requests for either 1 or 2 years of support and an increase in requests for 5 or more years of support. Requests for 1 or 2 years dropped from 11 percent to 5 percent of new applications and from 2 percent to 1 percent of competing continuations. By 1992, the number of years requested for new and competing continuation applications had shifted from shorter (particularly, the 3-year category) to longer durations. The most commonly requested duration was 5 years of support.

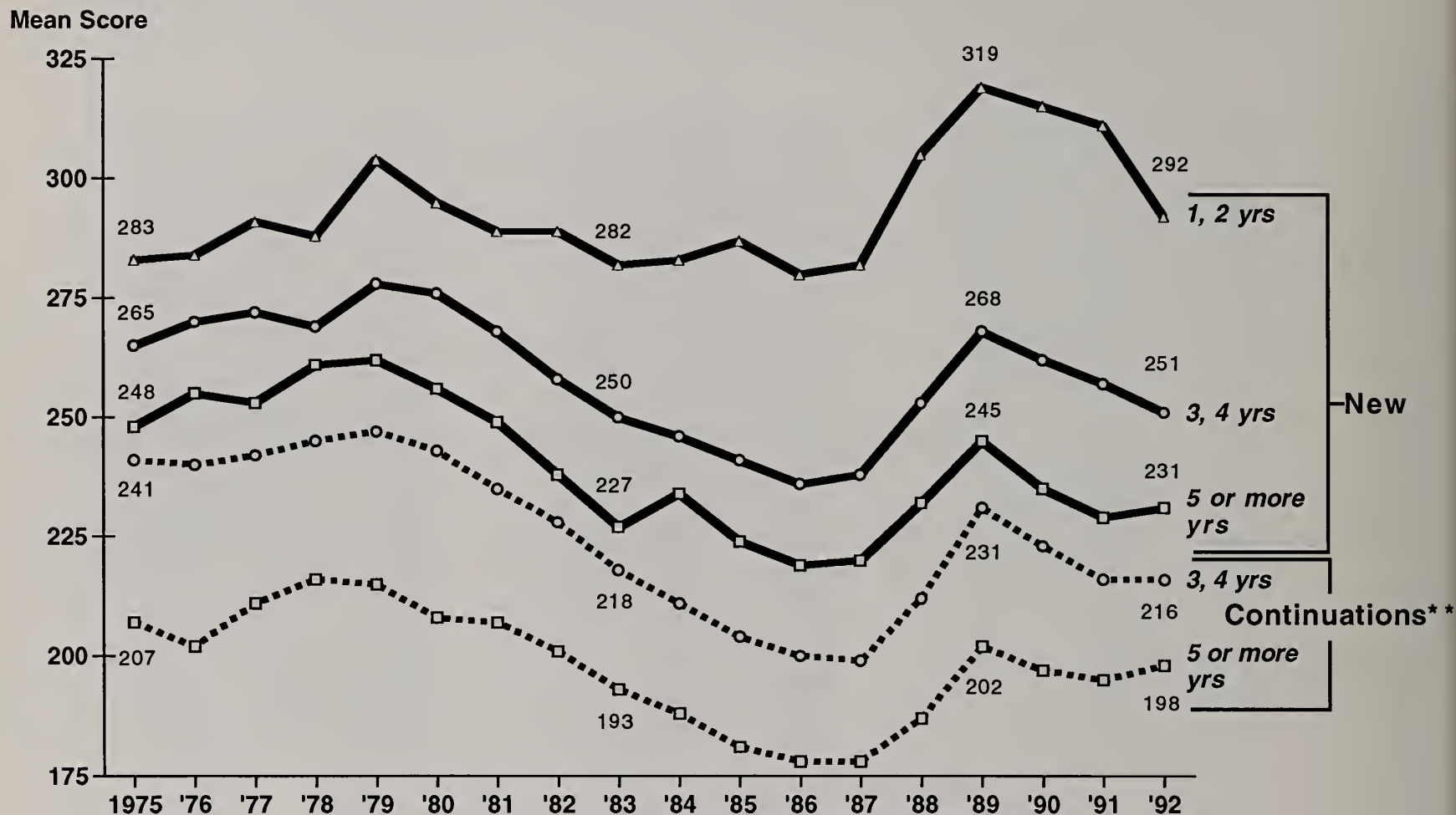
New applications differ from competing continuations in the proportions requesting various numbers of years. In 1992, 41 percent of the new applications requested 5 or more years of NIH support; 17 percent requested 4 years; 37 percent requested 3 years; and 5 percent requested 1 or 2 years. Competing continuation applications showed a somewhat similar ordering, but an altogether different set of proportions. Almost 70 percent of 1992 competing continuations requested 5 or more years of support; 17 percent requested 4 years; 12 percent requested 3 years; and only 1 percent requested 1 or 2 additional years. Since new applications outnumber competing continuations by more than two to one, the total R01 distribution more closely resembles that of the new applications. Nearly 50 percent of all 1990 applications requested 5 or more years, followed by 30 percent requesting 3 years.

The graphed data exclude all amendments, in order to present a clear picture of requests for support.

		<u>Number Reviewed*</u>		<u>Nonamendments</u>		<u>Amendments (%)</u>	
		<u>1983</u>	<u>1992</u>	<u>1983</u>	<u>1992</u>	<u>1983</u>	<u>1992</u>
<u>Years Requested</u>							
New Applications	1 & 2.....	1,110	423	934	349	176 (15.9)	74 (17.5)
	3.....	7,145	4,137	5,598	2,820	1,547 (21.7)	1,317 (31.8)
	4.....	719	1,893	554	1,299	165 (22.9)	594 (31.4)
	more than 4...	1,575	4,344	1,315	3,153	260 (16.5)	1,191 (27.4)
Competing continuations	1 & 2.....	81	45	61	29	20 (24.7)	16 (35.6)
	3.....	2,034	917	1,282	379	752 (37.0)	538 (58.7)
	4.....	479	966	350	535	129 (26.9)	431 (44.6)
	more than 4...	1,788	3,264	1,453	2,162	335 (18.7)	1,102 (33.8)

*By fiscal year of IRG review.

Mean Priority Scores of Competing R01 Applications* by Requested Years of Support, FY1975-1992



*Includes original and amended applications summarized by fiscal year of DRG study section review; excludes withdrawals and supplements. **Competing continuations requesting one or two years of support omitted due to small number.
Source: NIH, DRG, ISB, SAES

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Applicants requesting 5 or more years of support receive much better scores than those requesting fewer years, whether they are seeking new or competing continuation R01 funding. Poorest average scores are found on applications requesting support for only 1 or 2 years. The many applications seeking 3 years of support fall between these two extremes. This relationship between scores and requested years of support holds in every year since 1975.

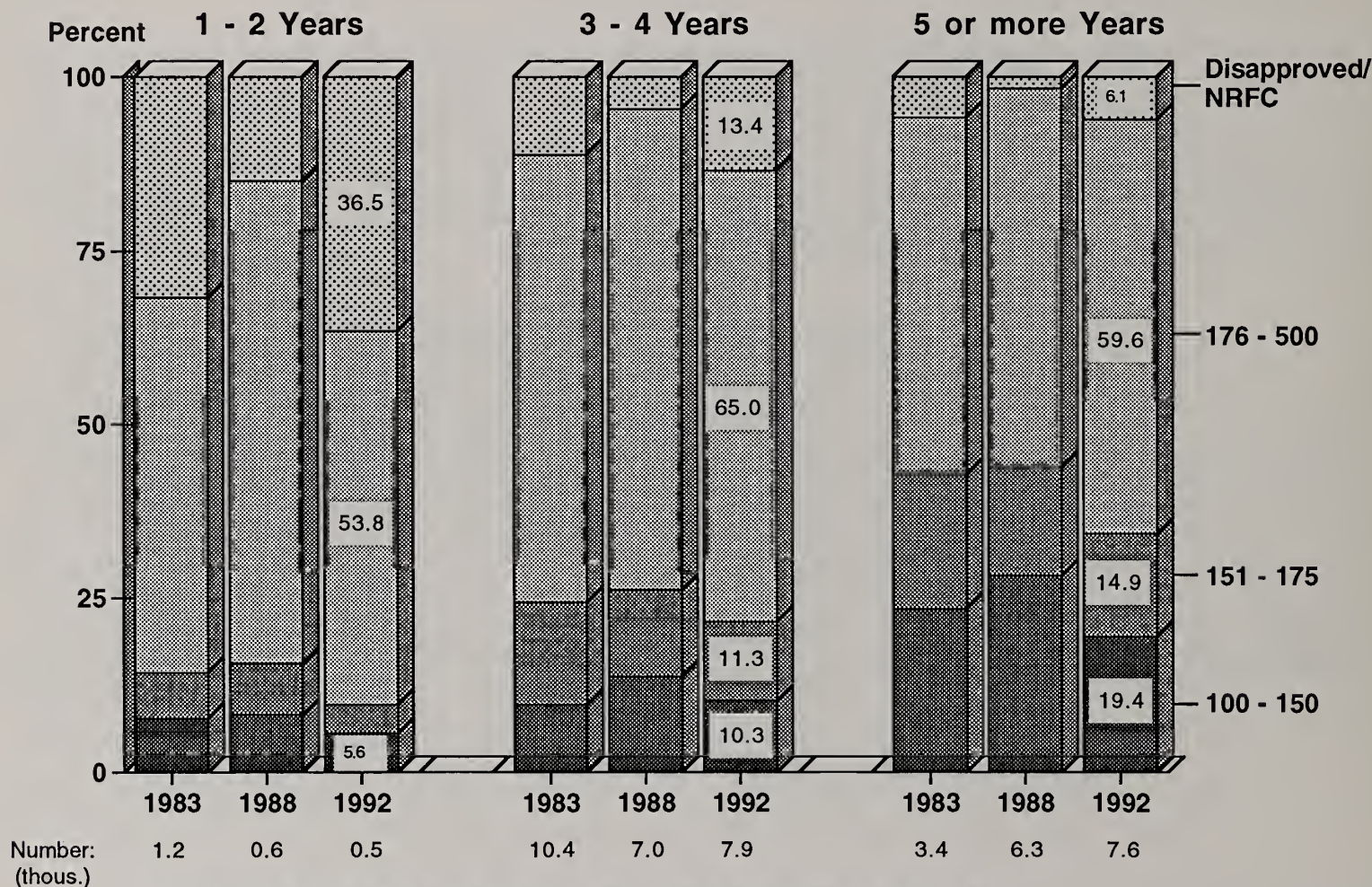
Along with Council and Institute concerns, priority scores (and their percentiles) form the basis for the success of applications. To the extent that longer term projects receive better priority scores, they have a higher probability of funding. In 1990, success rates for both new and competing continuation applications seeking 5 or more years of support were considerably higher than those seeking 1 or 2 years of support. In 1992, success rates ranged from 9 percent (one-to-two years requested) to a high of 22 percent (more than four years requested) on new applications and from 36 (one-to-two years requested) to 41 percent (more than four years requested) on competing continuations. While success rates for new applications have continued to be worse than those for competing continuations, it is also worth noting that the historically better-than-even odds for success of competing continuation applications requesting more than four years dropped to 46 percent in 1988 and continued to decline to 41 percent in 1992.

	Year	Mean Scores*				Success Rates**			
		Years Requested				Years Requested			
		1&2	3	4	>4	1&2	3	4	>4
New Applications	1983.....	282	251	242	227	13	23	26	32
	1985.....	287	240	241	224	14	22	23	30
	1987.....	282	239	232	220	15	22	25	30
	1989.....	319	270	259	245	9	15	17	23
	1991.....	311	261	241	229	11	15	21	22
	1992.....	292	256	241	231	9	15	21	22
	1983-92.....	+10	+5	-1	+4	-4	-8	-5	-10
Competing Continuations	1983.....	228	220	209	193	46	37	45	56
	1985.....	224	206	194	181	26	41	49	59
	1987.....	225	201	192	178	53	38	45	55
	1989.....	214	233	223	202	31	25	30	43
	1991.....	241	221	209	195	26	25	33	40
	1992.....	237	224	208	198	36	28	33	41
	1983-92.....	+9	+4	-1	+5	-10	-9	-12	-15

*By fiscal year of IRG review.

**Initial & amended applications by fiscal year of funds or requested start date.

DRG Study Section Score Distribution of Competing R01 Applications* by Requested Years of Support, FY1983, 1988, 1992



*Includes original and amended applications summarized by fiscal year of initial review; excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

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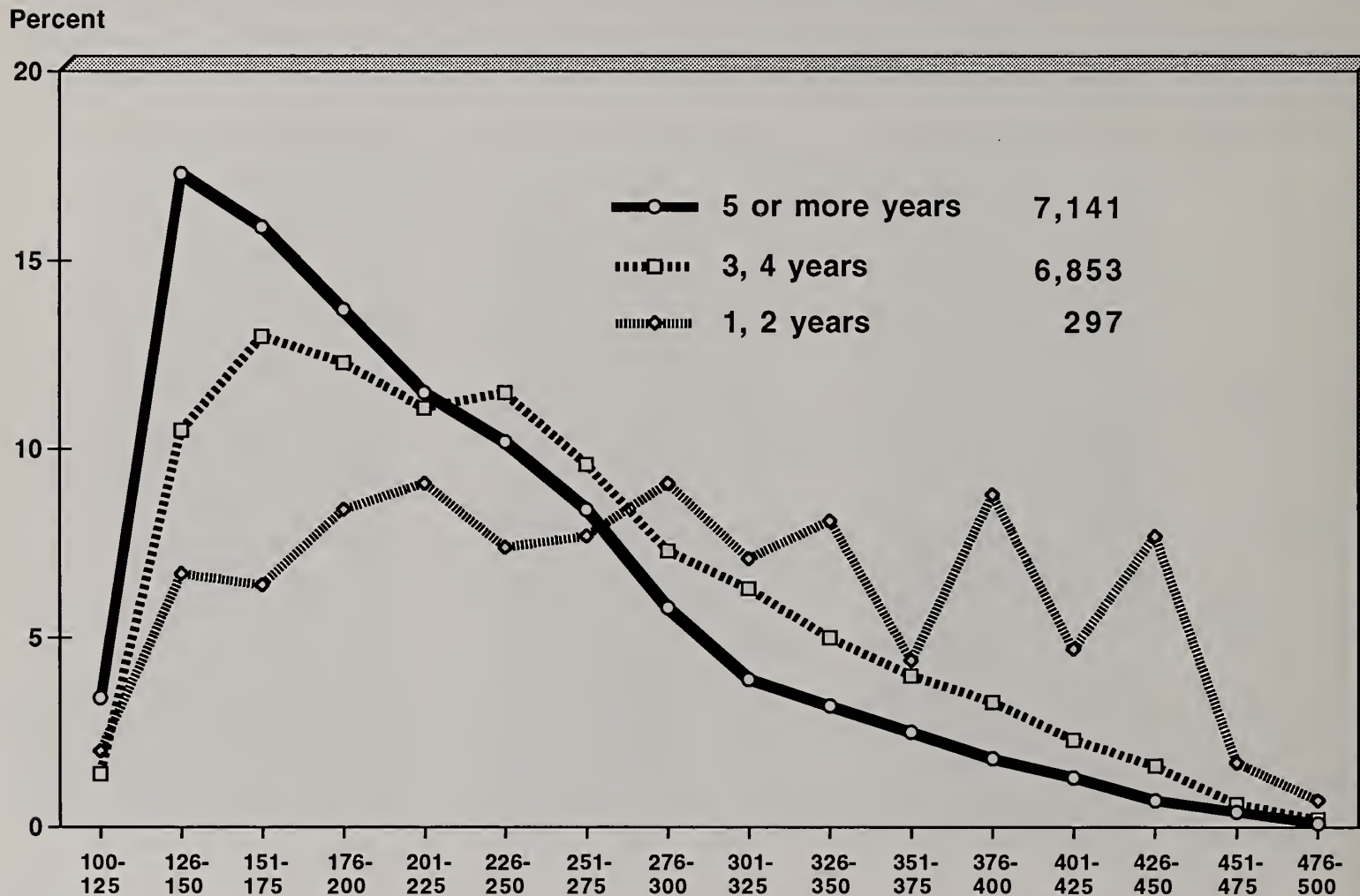
R01 applications with different requested years of support have dramatically different priority-score distributions, and are also rated quite differently. Requests for 5 or more years of support are, proportionally, rated more frequently and have lower (better) priority scores than do requests for 3 or 4 years. The latter are rated more frequently, and better than requests for only 1 or 2 years. In 1992, the proportions rated ranged from 61 percent of new applicants seeking 1 or 2 years to 97 percent of those seeking 5 or more years of competing continuation support. Differences are most pronounced for new applications; as expected, applications for competing continuation are more frequently rated in all groups.

	Percentage Rated			Percentage with Scores 100-175*		
	Years Requested			Years Requested		
	1&2	3&4	>4	1&2	3&4	>4
Total	1983.....68.3	88.9	94.2	14.4	24.4	42.7
	1988.....85.1	95.4	98.4	15.6	26.2	43.8
	1992.....63.5	86.6	93.9	9.6	21.5	34.3
	1983-92	-5.2	-2.3	-4.8	-2.9	-8.4
New Applications	1983.....66.5	86.6	89.3	12.8	21.5	30.8
	1988.....83.6	94.4	97.1	12.5	22.1	30.1
	1992.....60.8	84.1	91.3	7.1	17.9	25.6
	1983-92	-5.7	-2.5	-5.7	-3.6	-5.2
Competing Continuations	1983.....92.6	96.2	98.5	35.8	33.5	53.2
	1988.....97.1	98.8	99.6	34.7	39.5	56.7
	1992.....88.9	94.5	97.4	33.3	33.2	45.9
	1983-92	-3.7	-1.7	-2.5	-0.3	-7.3

*Based on reviewed applications by fiscal year of IRG review.

Since 1983, all three years-requested groups have shown a slight increase and then a decline in the proportion of R01 applications with scores in the 100-175 range. Those requesting 5 or more years have declined the most -- from 42.7 percent to 34.3 percent of reviewed applications, or a decrease of 8.4 percentage points. This is much steeper than the 4.8 percentage point decline for those requesting 1 or 2 years. And, while those requesting 3 or 4 years of support in 1992 had but 21.5 percent of their applications in the 100-175 range, this was only a drop of 2.9 percentage points from 1983. Percentages rated all tend to show an inverted- ν shape, coincident with the pattern of much lower priority scores in 1988.

Priority Score Distributions of DRG-Rated R01 Applications* by Requested Years of Support, FY1992



*Includes original and amended applications summarized by fiscal year of DRG study section review;
excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

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As seen in the prior pages, applications with different requested years of support have strikingly different priority score distributions. Of the 7,141 approved applications requesting 5 or more years of support in 1992, 20.7 percent received scores of 150 or better -- well above the 11.9 percent on applications requesting 3 or 4 years, and more than twice the 8.7 percent on applications requesting 1 or 2 years.

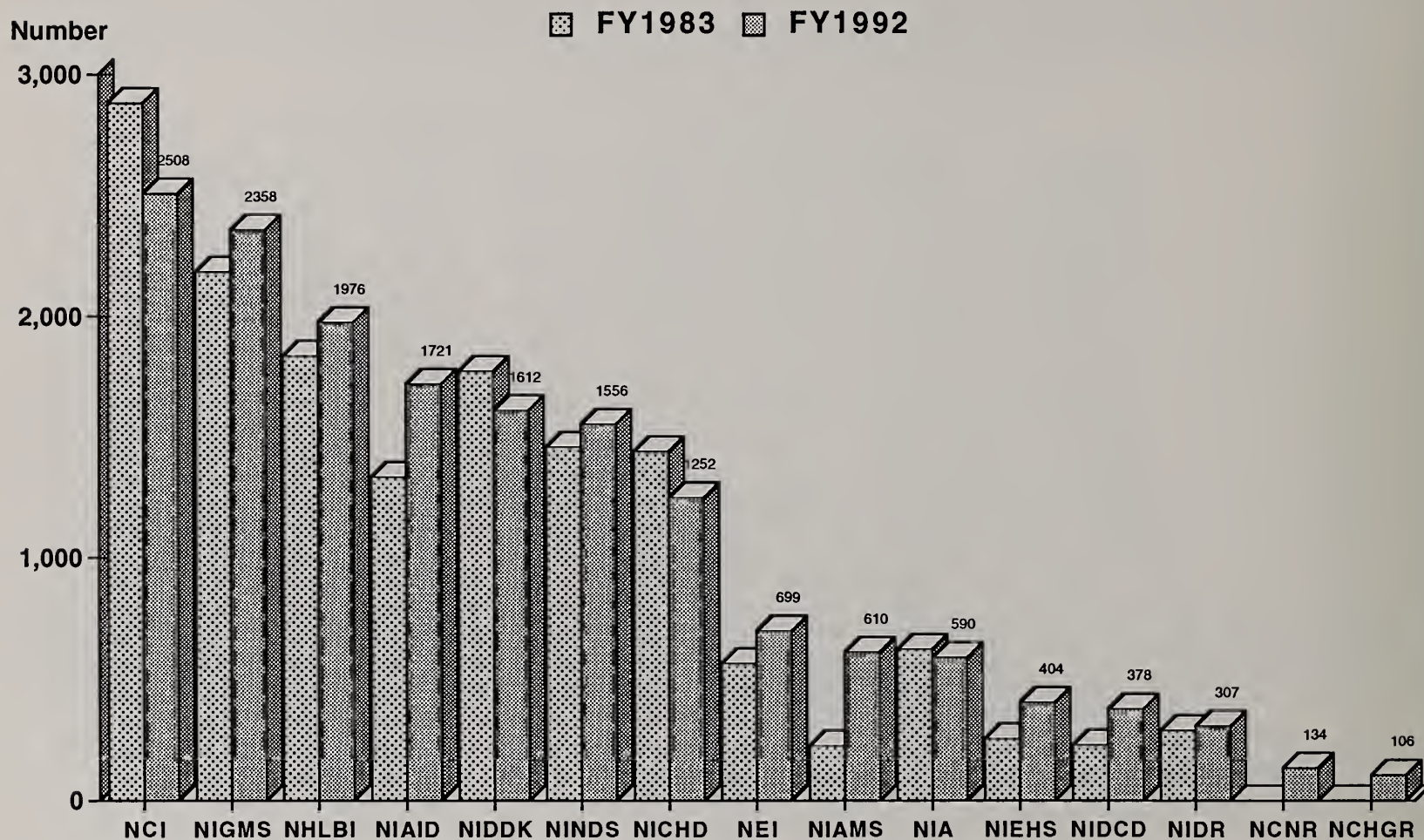
Priority Score Frequency Distribution Percentages

Scores	1983			1992		
	Year Requested			Years Requested		
	1,2	3,4	>4	1,2	3,4	>4
100-125.....	2.1	1.5	4.9	2.0	1.4	3.4
126-150.....	9.2	9.4	20.0	6.7	10.5	17.3
150-175.....	9.7	16.5	20.5	6.4	13.0	15.9
176-200.....	7.3	10.8	11.2	8.4	12.3	13.7
201-300.....	30.8	38.7	30.9	33.3	39.5	35.9
>300.....	41.0	23.1	12.5	43.1	23.3	13.9
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Number*.....	813	9,228	3,167	297	6,853	7,141
Mean.....	277	242	208	284	242	217
Median.....	273	231	184	280	230	200
St. dev.	98.2	81.3	74.4	97.0	81.2	74.5
C.V.	35.5	33.6	35.8	34.2	33.6	34.3

*Rated applications by fiscal year of IRG review.

Applications requesting 5 or more years of support include a much higher proportion of competing continuations than the other two years-requested groups. Nevertheless, the number of years requested bears a strong relationship to the scores of both new and competing continuation applications. It is also worth noting that the proportions within each priority score interval remain relatively constant.

Number of Competing DRG-Reviewed R01 Applications* by Assigned Institute, FY1983 Versus FY1992



*Excludes withdrawals and supplements. Includes original and amended applications summarized by fiscal year of initial review.
Source: NIH, DRG, ISB, SAES

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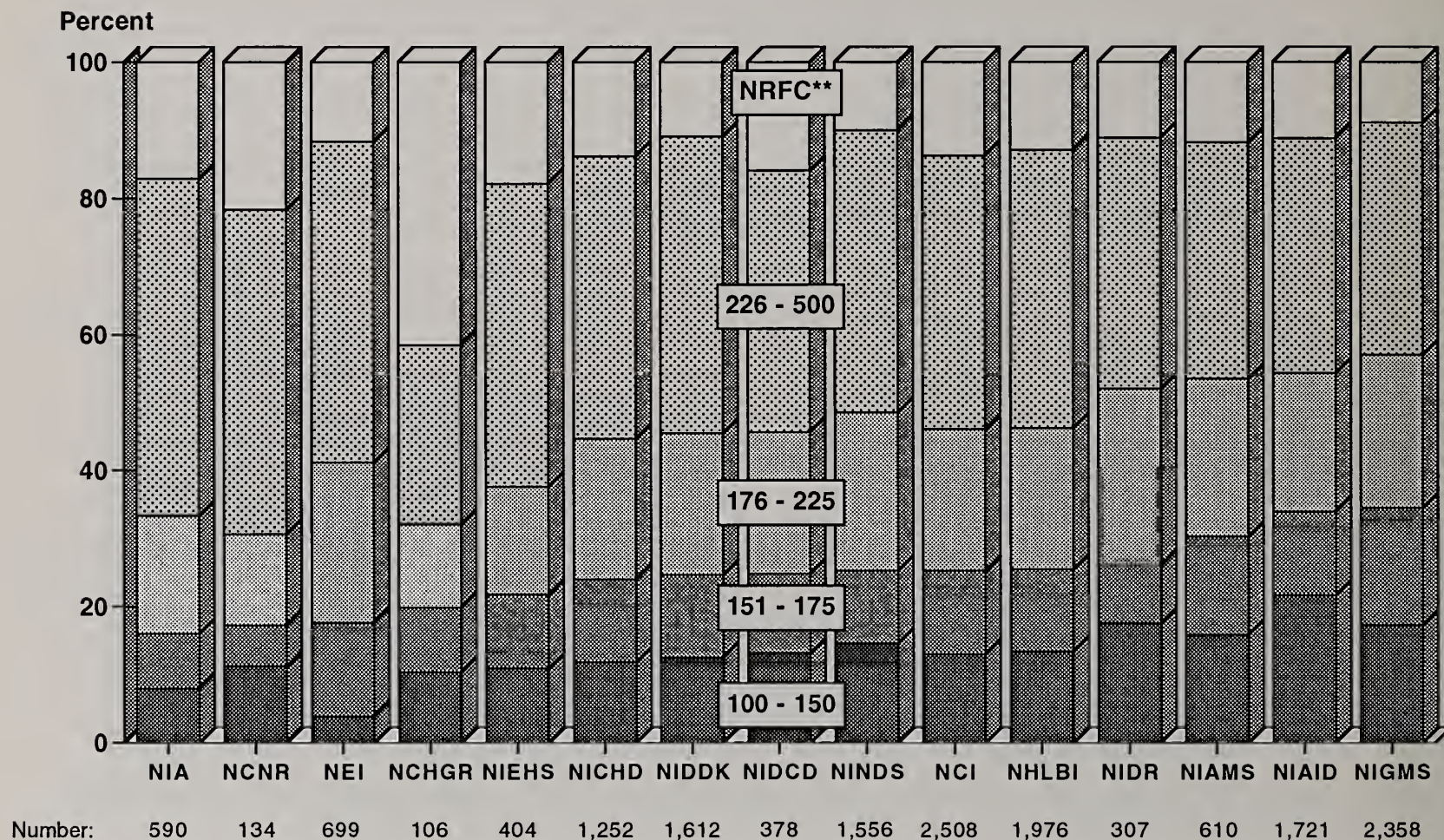
The National Cancer Institute (NCI) ranked first in the number of 1992 DRG-reviewed R01 applications -- about 15 percent of the NIH total. NCI also ranked first in 1983 with 19.1 percent of the NIH total, but its applications declined the most from 1983 to 1992, both by count (373) and percent (12.9). The National Institute of General Medical Sciences (NIGMS) remained a major referral with 14.5 percent, and the National Heart, Lung, and Blood Institute (NHLBI, the third-ranked Institute) stayed even with the general growth in applications. The National Centers for Human Genome Research (NCHGR) and Nursing Research (NCNR) were relative newcomers to NIH. They, and the National Institutes of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), Environmental Health (NIEHS), Dental Research (NIDR), Aging (NIA), Deafness and Other Communication Disorders (NIDCD) and the Eye Institute (NEI) were each assigned less than 5 percent of the total DRG-reviewed R01 applications in 1992. Perhaps in response to the HIV epidemic, the number of applications assigned to the Institute of Allergy and Infectious Diseases (NIAID) experienced the largest absolute increase over the period (386). The Eye Institute has consistently had a large proportion of competing continuation applications -- 42 percent in 1983 and 46 percent in 1990. Many Institutes experienced increases in their competing continuation application percentage.

	<u>No. Reviewed*</u>		<u>Change</u>		<u>Percentage</u>	
	<u>1983</u>	<u>1992</u>	<u>No.</u>	<u>%</u>	<u>Competing continuation</u>	
			<u>1983-1992</u>		<u>1983</u>	<u>1992</u>
NCHGR	-	106	+106	-	-	14.2
NCNR	-	134	+134	-	-	17.9
NIDR	288	307	+19	+6.6	40.3	34.2
NIDCD	230	378	+148	+64.3	28.3	24.3
NIEHS	254	404	+150	+59.1	26.8	23.8
NIA	623	590	-33	-5.3	17.8	17.8
NIAMS	226	610	+384	+169.9	32.7	26.2
NEI	564	699	+135	+23.9	42.2	45.9
NICHHD	1,441	1,252	-189	-13.1	21.6	62.7
NINDS	1,460	1,556	+96	+6.6	27.5	38.0
NIDDK	1,775	1,612	-163	-9.2	36.5	37.6
NIAID	1,335	1,721	+386	+28.9	28.4	32.0
NHLBI	1,837	1,976	+139	+7.6	28.7	31.7
NIGMS	2,185	2,358	+173	+7.9	35.1	37.2
NCI	2,881	2,508	-373	-12.9	26.5	27.8
Minimum...	226	106	-373	-12.9	17.8	14.2
Maximum...	2,881	2,508	+386	+169.9	42.2	62.7

*By fiscal year of IRG review; Institutes ranked by the number reviewed in 1992.

DRG's Referral and Review Branch assigns competing applications to the appropriate NIH Institute and DRG study section or Institute initial review group. Assignments are based on each Institute's overall mission and specific program interests.

DRG Study Section Action on Competing R01 Applications* by Assigned Institute, FY1992



Note: Ranked by percent of rated applications scored 100-175.

*Includes original and amended applications summarized by fiscal year of initial review. Excludes withdrawals and supplements.

**Not recommended for further consideration.

Source: NIH, DRG, ISB, SAES

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The different Institutes have significantly different distributions of R01 priority scores. For example, in 1983, about 40 percent of the NIDCD applications received scores of 175 or better -- more than double the proportion with these scores on NIEHS applications. Such priority score differences among Institutes appear in both new and competing continuation applications. The Institutes also differ in the amount of priority score change they have experienced since 1983, with NIEHS and NHLBI showing the largest increases in the proportion of applications scored 100-175. NIDCD and NEI showed the largest declines in proportions in this score range.

Percentage Scored 100-175*

	Total			New		Competing continuation	
	1983	1992	Diff.	1983	1992	1983	1992
NIA....	21.0	16.0	-5.0	20.4	15.3	23.0	35.4
NCNR**	-	17.2	-	-	21.8	-	22.3
NEI....	29.8	17.6	-12.2	27.6	14.0	32.8	26.0
NCHGR**	-	19.8	-	-	29.8	-	46.7
NIEHS...	18.1	21.8	+3.7	11.9	21.8	33.9	38.3
NICHD...	28.5	24.0	-4.5	25.0	20.7	39.7	40.5
NIDDK...	31.2	24.7	-6.5	24.6	20.9	41.7	38.1
NIDCD...	40.2	24.8	-15.4	32.1	22.8	57.1	47.6
NINDS...	32.6	25.3	-7.3	27.3	22.1	44.8	37.5
NCI....	28.5	25.3	-3.2	22.8	22.6	42.3	44.6
NHLBI...	25.5	25.5	0.0	20.5	23.5	36.8	40.4
NIDR....	29.0	26.1	-2.9	30.0	22.0	27.7	42.0
NIAMS...	35.4	30.3	-5.1	25.8	29.1	52.1	47.6
NIAID...	37.3	34.0	-3.3	31.9	32.3	50.5	49.4
NIGMS...	39.7	34.5	-5.2	33.1	28.1	51.0	53.2
Minimum...	18.1	16.0	-2.1	11.9	14.0	23.0	22.3
Maximum...	40.2	34.5	-5.7	33.1	32.3	57.1	53.2

*Based on rated applications by fiscal year of IRG review.

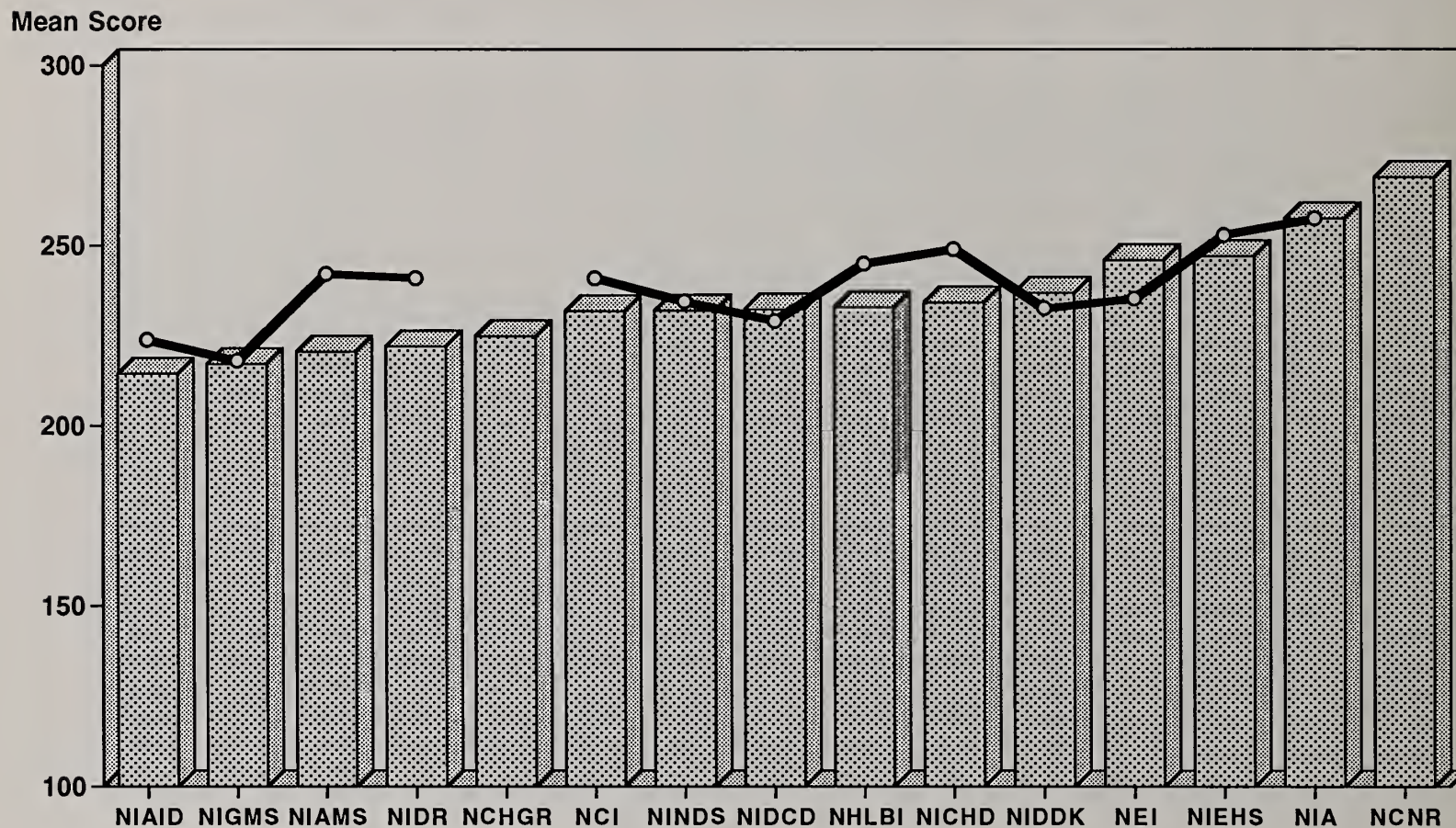
**Did not exist in 1983.

Most Institutes' applications are reviewed by several study sections. Since priority-score distributions (and means) differ from one study section to another, Advisory Councils/Boards and Institute staff now use the percentile rank of each application within its study section to make funding decisions.

Mean Priority Scores of DRG-Rated R01 Applications* by Assigned Institute

FY1992

 FY1983



Note: Ranked by FY1992 mean scores.

*Includes original and amended applications summarized by fiscal year of initial review. Excludes withdrawals and supplements.

Source: NIH, DRG, ISB, SAES

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In 1992, mean priority scores ranged from 214 on competing R01 applications assigned to NIAID to 269 on applications for NCNR. Although there have been some exceptions and year-to-year variation, Institute-by-Institute rankings on mean priority scores have remained remarkably similar since 1983. Decision making has shifted to percentiles, but these mean priority scores show the historical trends.

New, competing continuation, and applications excluding amendments have followed a similar ranking pattern. Factors that are related to overall scores, such as the number of requested years of support or whether an application is from a basic or clinical department, are not believed to have been the primary cause of Institute differences.

An Institute's success rate depends on its available funds, average cost of recommended applications, as well as its applications' percentile scores. Note that these figures reflect DRG-reviewed applications only.

	<u>Mean Scores*</u>			<u>1992 Means</u>		<u>Success Rate**</u>	
	<u>1983</u>	<u>1988</u>	<u>1992</u>	<u>New</u>	<u>Competing continuation</u>	<u>1983</u>	<u>1992</u>
NCNR.....	-	-	269	272	256	-	16.1
NIA.....	258	274	258	266	223	19.9	27.6
NIEHS....	253	234	247	260	215	33.8	26.2
NEI.....	235	236	246	261	231	41.2	30.9
NIDDK....	233	229	237	252	215	35.2	24.4
NICHD....	249	242	234	249	208	27.3	25.5
NHLBI....	245	235	233	244	211	29.8	23.1
NCI.....	241	230	232	245	201	27.8	27.9
NIDCD....	229	221	232	245	199	32.9	29.3
NINDS....	235	228	232	248	208	29.1	26.0
NCHGR....	-	-	225	236	191	-	21.2
NIDR.....	241	239	222	231	207	38.1	26.7
NIAMS....	242	225	221	232	192	35.3	19.6
NIGMS....	218	212	217	235	189	38.3	34.3
NIAID....	224	214	214	225	194	34.2	24.0
Minimum..	218	212	214	225	189	19.9	16.1
Maximum..	258	274	269	272	256	41.2	34.3

*By fiscal year of IRG review.

**By fiscal year of funds or requested start date from award rate file.

4. PRINCIPAL INVESTIGATOR CHARACTERISTICS RELATED TO STUDY SECTION ACTION

Degree of applicant

Number of applications

New and competing continuation applications

Study section actions: Score distributions

Mean priority score trends

Age of applicant

Distribution of applications (total)

Distribution of applications (new, competing continuations)

Difference in mean priority scores

Gender of applicant

Distribution of applications (new, competing continuations)

Difference in age

Study section actions: Score distributions

Mean priority score trends

Race/ethnic origin of applicant

Frequency distributions of minority applicants

Study section actions: Score distributions

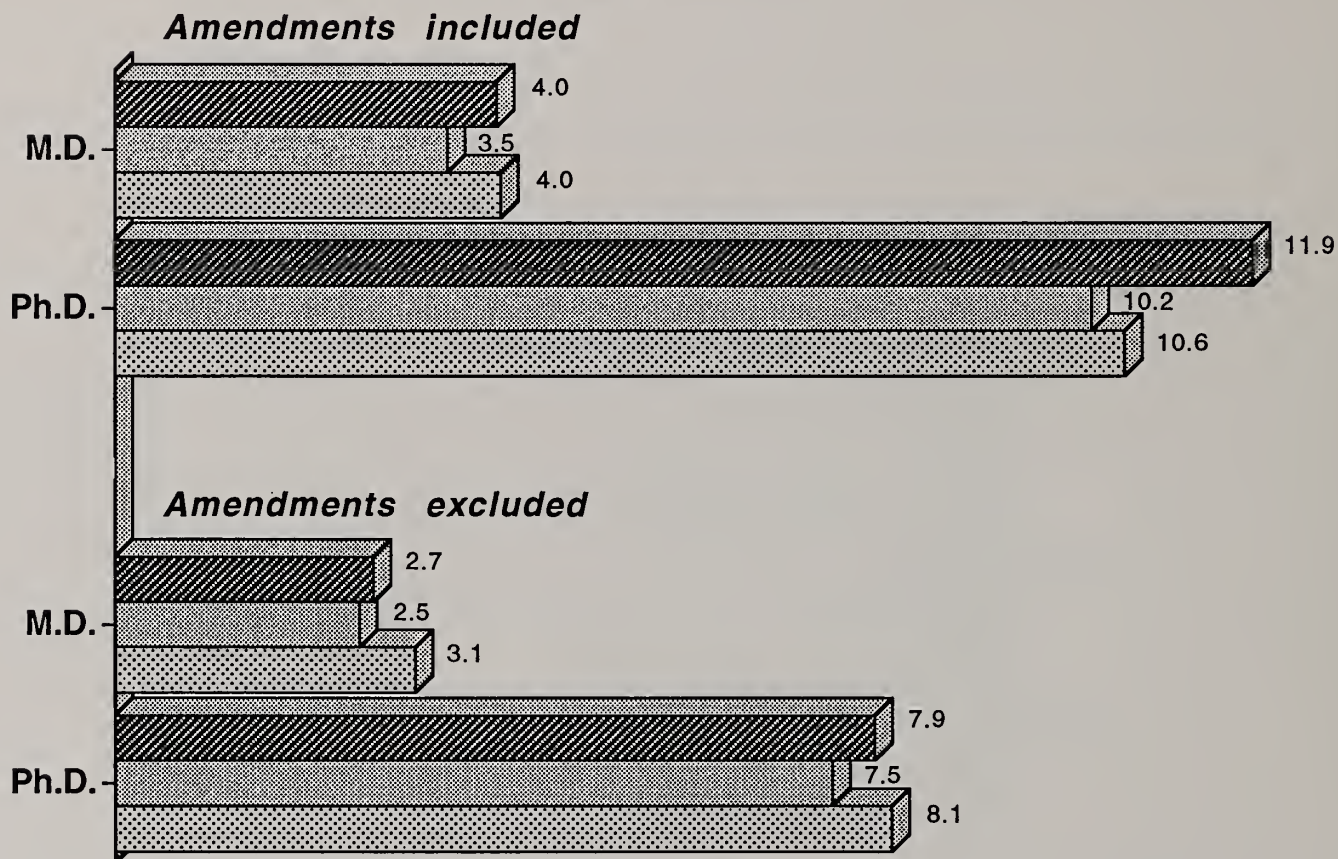
Difference in mean priority scores

Number of DRG-Reviewed Competing R01 Applications* **by Degree** of Applicant** *(number in thousands)*

FY1992

FY1988

FY1983



*Summarized by fiscal year of initial review. **M.D. includes MD, MB, BM, BMD, FRCP, and joint MD/PhD degrees. Ph.D. includes PhD, EdD, DSc, ScD, DEng, DPh, DPhil, DPhil, DPE, DSN, DNS, DSW, DED, and PsyD. Other or unknown degrees are not shown.
 Source: NIH, DRG, ISB, SAES

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During the past 10 years, applicants with a Ph.D. or another research degree have both: (a) submitted substantially more R01 applications and (b) shown more growth in number than applicants with an M.D. or another clinical doctorate. In 1983 applications from Ph.D.'s outnumbered those from M.D.'s by 2.6 to 1; by 1992 this ratio was nearly 3 to 1. The quantity of M.D. applications remained roughly constant between 1983 and 1985, dropped sharply for the next two years, and eventually returned to a one percent decline in 1992. At the same time, the number of applications from Ph.D.'s grew by 1,319, or 12.5 percent. Both groups showed year-to-year fluctuations within these trends.

The number of initial applications (excluding amendments) from M.D.'s has declined by 443 -- from 3,138 in 1983 to 2,695 in 1992. Initial applications from Ph.D.'s decreased by 178, from 8,118 to 7,940 during the same time period. The percentage of initial applications declined by about 10 percentage points for both groups, suggesting an increasing reliance on amended applications.

	<u>Reviewed Applications</u>			<u>Excluding Amendments</u>		
	<u>M.D.*</u>	<u>Ph.D.</u>	<u>Other</u>	<u>M.D.*</u>	<u>Ph.D.</u>	<u>Other</u>
1983.....	4,030	10,550	351	3,138	8,118	291
1984.....	4,103	11,144	374	3,180	8,537	316
1985.....	4,134	11,898	386	3,189	8,933	291
1986.....	3,810	11,176	283	2,842	8,269	207
1987.....	3,384	10,120	224	2,517	7,210	179
1988.....	3,478	10,198	205	2,549	7,501	166
1989.....	4,095	11,564	212	2,877	7,968	143
1990.....	4,123	11,660	192	2,672	7,728	144
1991.....	3,746	10,950	154	2,446	6,985	99
1992.....	3,991	11,869	130	2,695	7,940	92
1983-92.....	-39	+1,319	-221	-443	-178	-199
Percent.....	-1.0	+12.5	-63.0	-14.1	-2.2	-68.4

*For degree definition, see Technical Note No. 7.

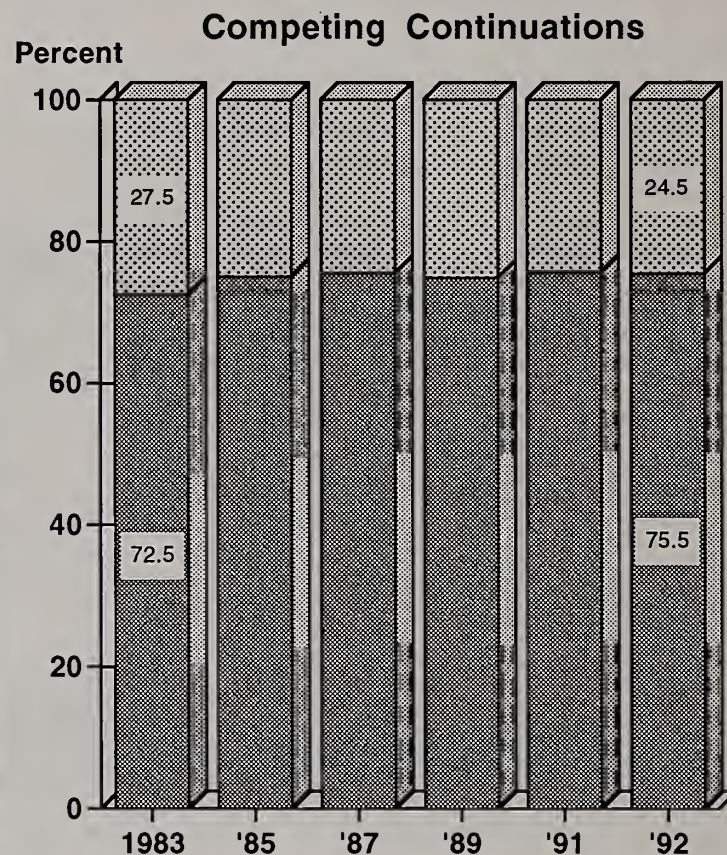
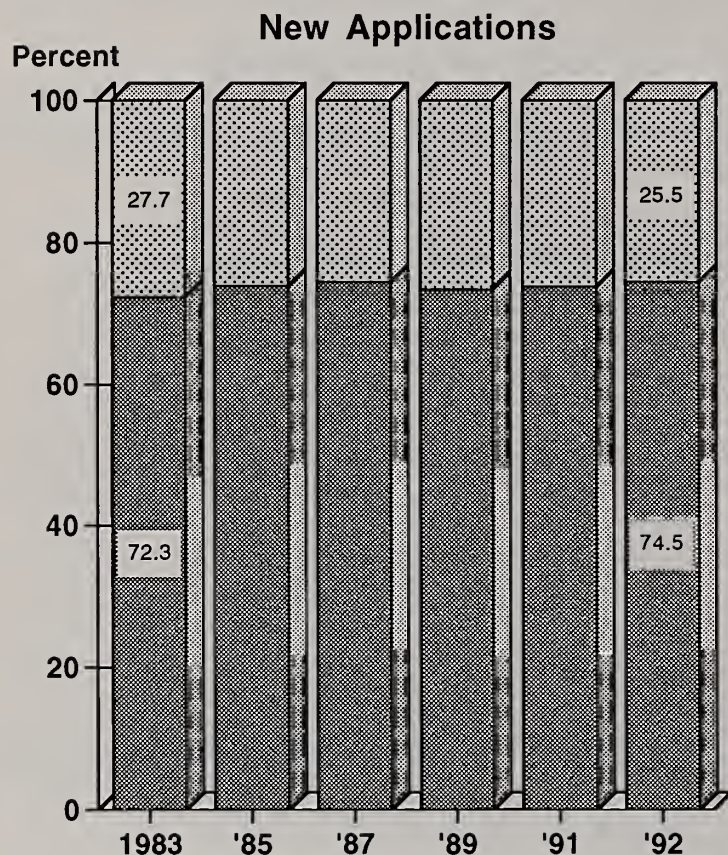
Summarized by fiscal year of IRG review.

The above data show a convergence in the proportion of amended applications submitted by M.D. and Ph.D. applicants. Amendments make up the following percentages of reviewed R01 applications:

	<u>M.D.</u>	<u>Ph.D.</u>	<u>Other</u>	<u>Total</u>
1983.....	22.1%	23.1%	17.1%	22.7%
1986.....	25.4	26.0	26.9	25.9
1989.....	29.7	31.1	32.5	30.8
1992.....	32.5	33.1	29.2	32.9

DRG-Reviewed Competing R01 Applications* **by Degree** of Applicant and Type of Application, FY1983-1992 †**

■ Ph.D. ▨ M.D.



*Summarized by fiscal year of initial review. **M.D. includes MD, MB, BM, BMD, FRCP, and joint MD/PhD degrees. Ph.D. includes PhD, EdD, DSc, ScD, DEng, DPh, DPhil, DPhil, DPE, DSN, DNS, DSW, DED, and PsyD. Other or unknown degrees are not shown. †Selected years.
 Source: NIH, DRG, ISB, SAES

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The proportion of applicants with an M.D. or another clinical doctorate declined on both new and competing continuation R01 applications from 1983 to 1987, and thereafter remained relatively constant. New applications from M.D.'s dropped from 27.7 percent in 1983 to 25.5 percent in 1992. The proportion of competing continuation from M.D.'s is down 3.0 percentage points, from 27.5 to 24.5 percent.

	New Applications		Competing Continuations	
	Number	% M.D.*	Number	% M.D.*
1983.....	10,257	27.7	4,323	27.5
1985.....	11,419	26.1	4,613	24.9
1987.....	8,491	25.5	5,013	24.4
1989.....	10,583	26.6	5,076	25.1
1991.....	9,563	26.2	5,133	24.3
1992.....	10,704	25.5	5,156	24.5
1983-92.....	+447	-2.2	+833	-3.0

In 1992, M.D. applicants submitted 111 fewer new applications and 72 more competing continuations than in 1983. By contrast, Ph.D.'s and other research doctorates submitted 558 more new applications and 761 more competing continuations. With amendments excluded (table below), both new and competing continuation applications from M.D.'s are fewer. The number of nonamended new applications declined from 1983 through 1992, but competing continuations increased.

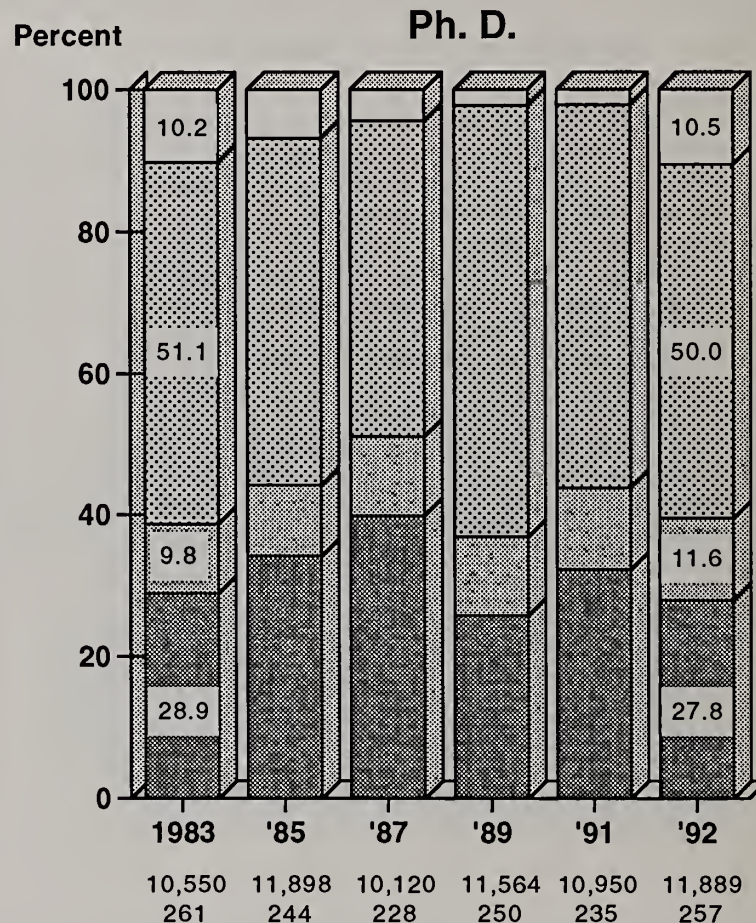
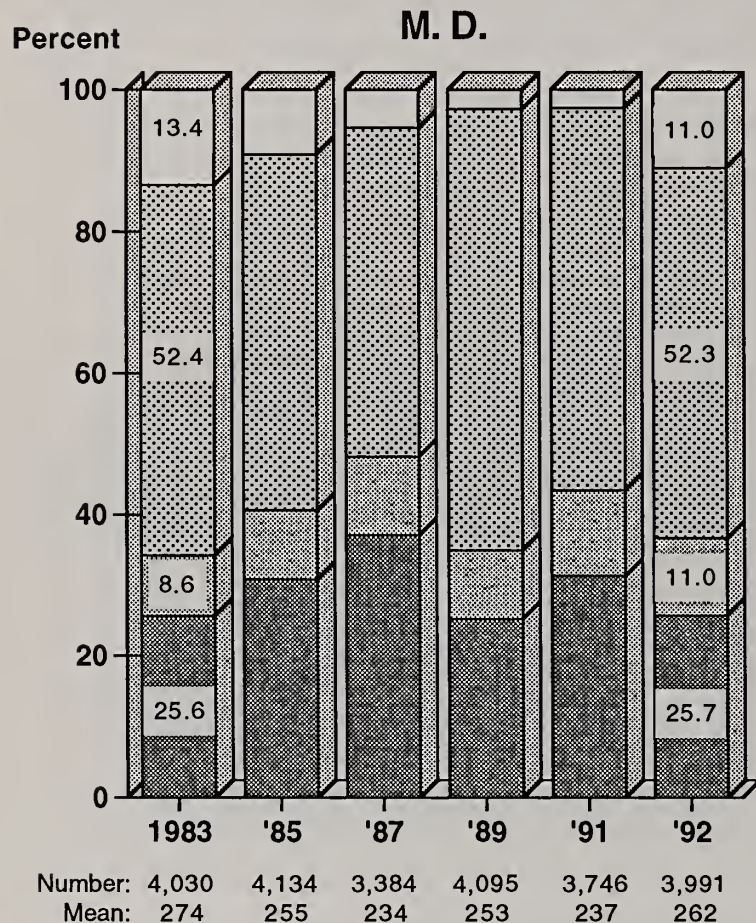
	New		Competing Continuations		Excluding Amendments			
	M.D.*	Ph.D.	M.D.	Ph.D.	New		Competing Continuations	
					M.D.	Ph.D.	M.D.	Ph.D.
1983	2,840	7,417	1,190	3,133	2,269	5,887	869	2,231
1988	2,276	6,531	1,202	3,667	1,731	5,002	818	2,499
1992	2,729	7,975	1,262	3,894	1,941	5,607	754	2,333
1983-92	-111	+558	+72	+761	-328	-280	-115	+102

*For degree definition, see Technical Note 7. Summarized by fiscal year of IRG review.

Note: Interest in other grant mechanisms for medical scientists, however, have increased. These include the Clinical Investigator Award (K08) and Physician Scientist Award (K11, K12) -- activities which are generally reviewed by Institute review panels (cf. pp. 4-7).

Score Distribution for DRG-Reviewed Competing R01 Applications* by Degree** of Applicant, FY1983-1992†

■ 100-175 ▨ 176-200 ▩ 201-500 □ Dis. / NRFC



*Summarized by fiscal year of initial review. **M.D. includes MD, MB, BM, BMD, FRCP, and joint MD/PhD degrees.

Ph.D. includes PhD, EdD, DSc, ScD, DEng, DPh, DPhil, DPE, DSN, DNS, DSW, DED, and PsyD. Other or unknown degrees are not shown. †Selected years.

Source: NIH, DRG, ISB, SAES

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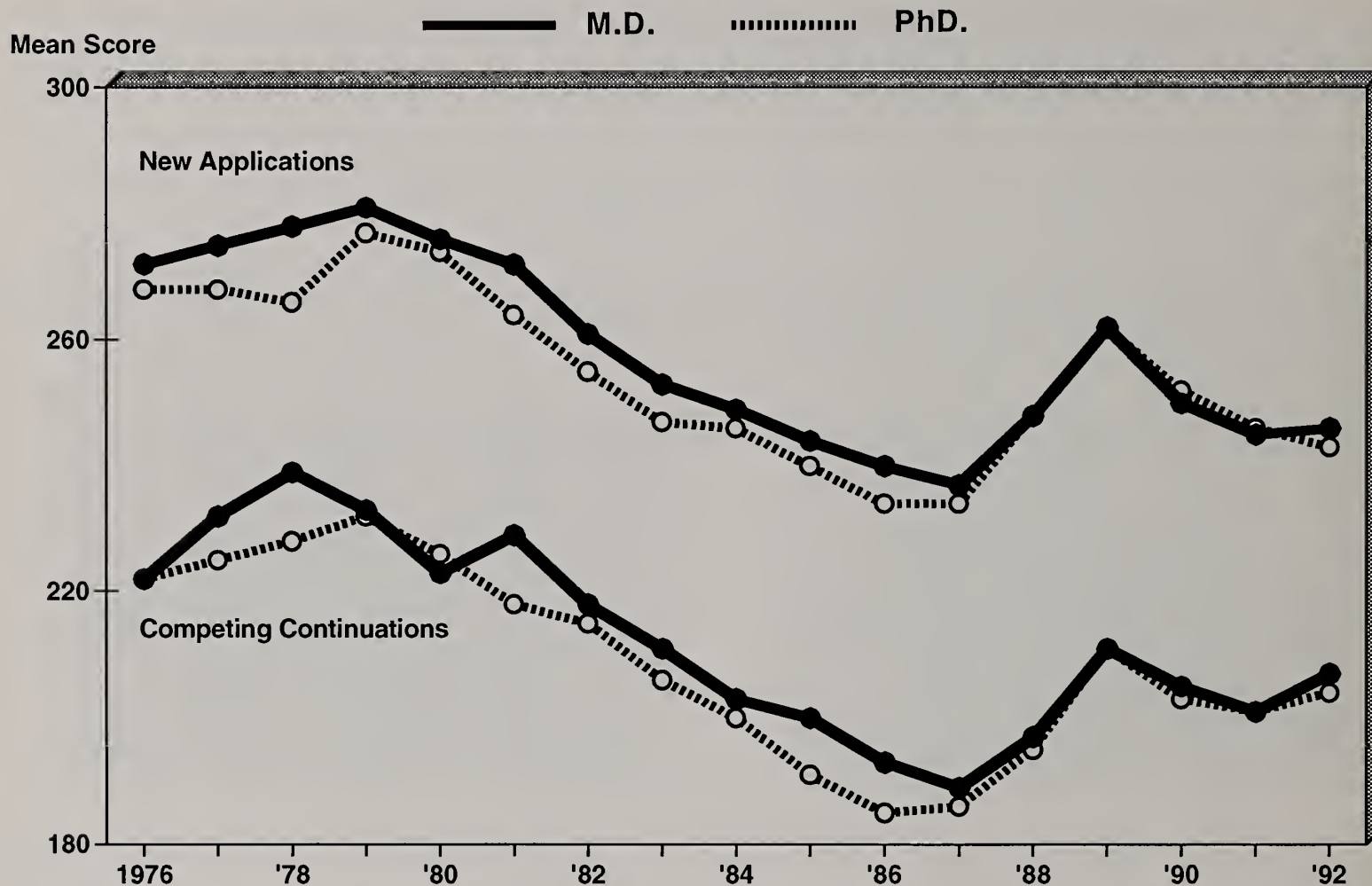
Until the October 1988 Councils, an increasing proportion of reviewed applications from both M.D. (and other clinical doctorates) as well as Ph.D. (and other research doctorates) received scores in the 100-150 range. As a result of the use of percentile ranking as an indicator of application quality and the use of common descriptive adjectives, however, applications reviewed for the October Council (and thereafter) showed a sharp decline in scores in this range. Thus, the overall 1988 percentage in this score range dropped for the first time in 10 years. This percentage continued to drop through 1989, increasing in 1990 and 1991 and declined again in 1992.

M.D. applicants have a slightly higher rate of disapproval/NRFC and a slightly lower percentage of scores in the 100-175 range than Ph.D. applicants. Differences between M.D. and Ph.D. rates range from 1 to 3 percentage points each year.

Disapproval of applications from M.D.'s declined by 10.9 percentage points -- from 13.4 percent in 1983 to 2.5 percent in 1991. The NRFC classification substantially lowered the proportion of rated M.D. applications in 1992. Ph.D. applicants, with a slightly lower initial disapproval rate (10.2 percent), also saw a decline in disapprovals (8.1 percentage points, through 1991). The NRFC classification also substantially lowered the proportion of rated Ph.D. applications in 1992.

<u>Percentage Disapproved/NRFC</u>		<u>Percentage 100-150</u>		<u>Percentage 100-175</u>	
<u>M.D.</u>	<u>Ph.D.</u>	<u>M.D.</u>	<u>Ph.D.</u>	<u>M.D.</u>	<u>Ph.D.</u>
1983.....13.4	10.2	11.4	13.4	25.6	28.9
1984.....12.0	9.4	12.8	14.3	28.4	31.0
1985..... 9.1	6.8	17.4	19.4	30.8	34.2
1986..... 6.5	5.0	22.0	22.3	35.5	38.6
1987..... 5.3	4.4	23.7	24.6	37.1	39.9
1988..... 3.7	3.5	20.2	20.1	33.2	34.1
1989..... 2.7	2.2	12.5	11.4	25.2	25.8
1990..... 1.9	1.8	16.1	15.5	28.9	29.5
1991..... 2.5	2.1	19.0	17.7	31.3	32.3
1992.....11.0	10.3	14.1	14.6	25.7	27.8
1983-91.....-10.9	-8.1	+7.6	+4.3	+5.7	+3.4
1983-92..... -2.4	+0.7	+2.7	+1.2	+0.1	-1.1

Mean Priority Scores of DRG-Reviewed Competing R01 Applications* by Degree** of Applicant, FY1976-1992



*Summarized by fiscal year of initial review. Excludes withdrawals and supplements. Includes original and amended applications.

**M.D. includes MD, MB, BM, BMD, FRCP, and joint MD/PhD degrees. Ph.D. includes PhD, EdD, DSc, ScD, DEng, DPh, DPhil, DPhil, DPE, DSN, DNS, DSW, DED, and PsyD. Other or unknown degrees are not shown.

Source: NIH, DRG, ISB, SAES

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In general, Ph.D.'s averaged slightly better scores than M.D.'s (including M.D./Ph.D.) on both new and competing continuation R01 applications through 1987. Subsequently, mean score differences have become 3 points or less; as such, their performances are approximately equivalent.

	<u>New Applications</u>		<u>Competing continuations</u>	
	<u>M.D.*</u>	<u>Ph.D.</u>	<u>M.D.*</u>	<u>Ph.D.</u>
1983.....	253	247	211	206
1985.....	244	240	200	191
1987.....	237	234	189	186
1989.....	262	262	211	211
1991.....	245	246	201	201
1992.....	246	243	207	204

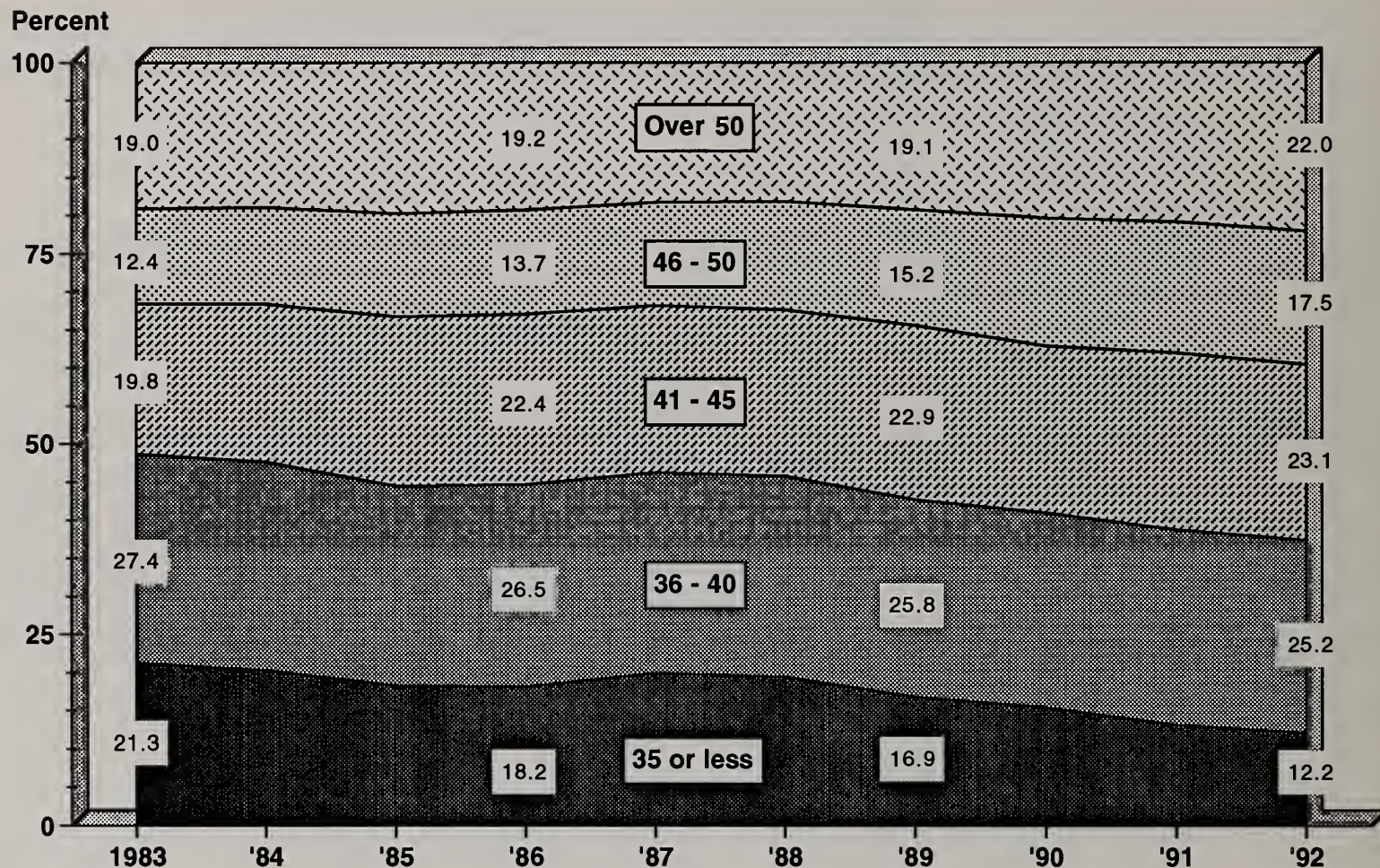
Regardless of the applicant's degree, applications from basic science departments average better scores than those from clinical or other departments. (See Technical Note 16, page *xii* regarding the present definitions of "basic" and "clinical" science.)

		<u>Number Reviewed</u>		<u>Mean Priority Scores</u>	
		<u>M.D.*</u>	<u>Ph.D.</u>	<u>M.D.*</u>	<u>Ph.D.</u>
Basic Science	1983.....	721	5,656	251	243
	1985.....	719	6,338	237	229
	1987.....	562	5,302	221	215
	1989.....	676	5,877	237	241
	1991.....	645	5,468	226	225
	1992.....	637	5,839	253	246
Clinical Science	1983.....	2,274	1,606	281	277
	1985.....	2,382	1,899	254	251
	1987.....	1,927	1,628	235	231
	1989.....	2,262	1,794	255	252
	1991.....	2,082	1,907	238	241
	1992.....	2,198	2,117	263	264
Other Departments	1983.....	117	1,663	292	304
	1985.....	95	1,791	294	284
	1987.....	105	1,663	262	264
	1989.....	128	1,961	268	271
	1991.....	141	1,736	251	258
	1992.....	125	1,791	274	278

From institutions of higher education; summarized by fiscal year of IRG review.

*M.D. includes joint M.D./Ph.D.

Age* Distribution of Principal Investigators for DRG-Reviewed Competing R01, R23, and R29 Applications,** FY1983-1992



*Age computed as of October of specified year.

**Competing applications summarized by requested start date or fiscal year of funds.

Source: NIH, DRG, ISB, SAES

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To encourage those beginning (typically younger) investigators in their pursuit of NIH funding, two mechanisms (the R23 and, subsequently, the R29) were developed. To better illustrate age trends in demographic strata, R23's, R29's, and R01's were chosen for these analyses.

Despite such an inclusion of typically younger investigators, however, the major change in the age of these applicants has been a steady annual erosion in the proportion who are 35 years of age or younger. This proportion has declined from 21.3 percent of applications in 1983 to only 12.2 percent in 1992. This includes an annual decline in the small group of applications from those who are 26 to 30 (2.8 percent in 1983 to 1.1 in 1992). While the advent of FIRST (R29) awards in 1987 may have interrupted this trend briefly, the young-researcher segment of applicants now has slipped to its lowest point in a decade.

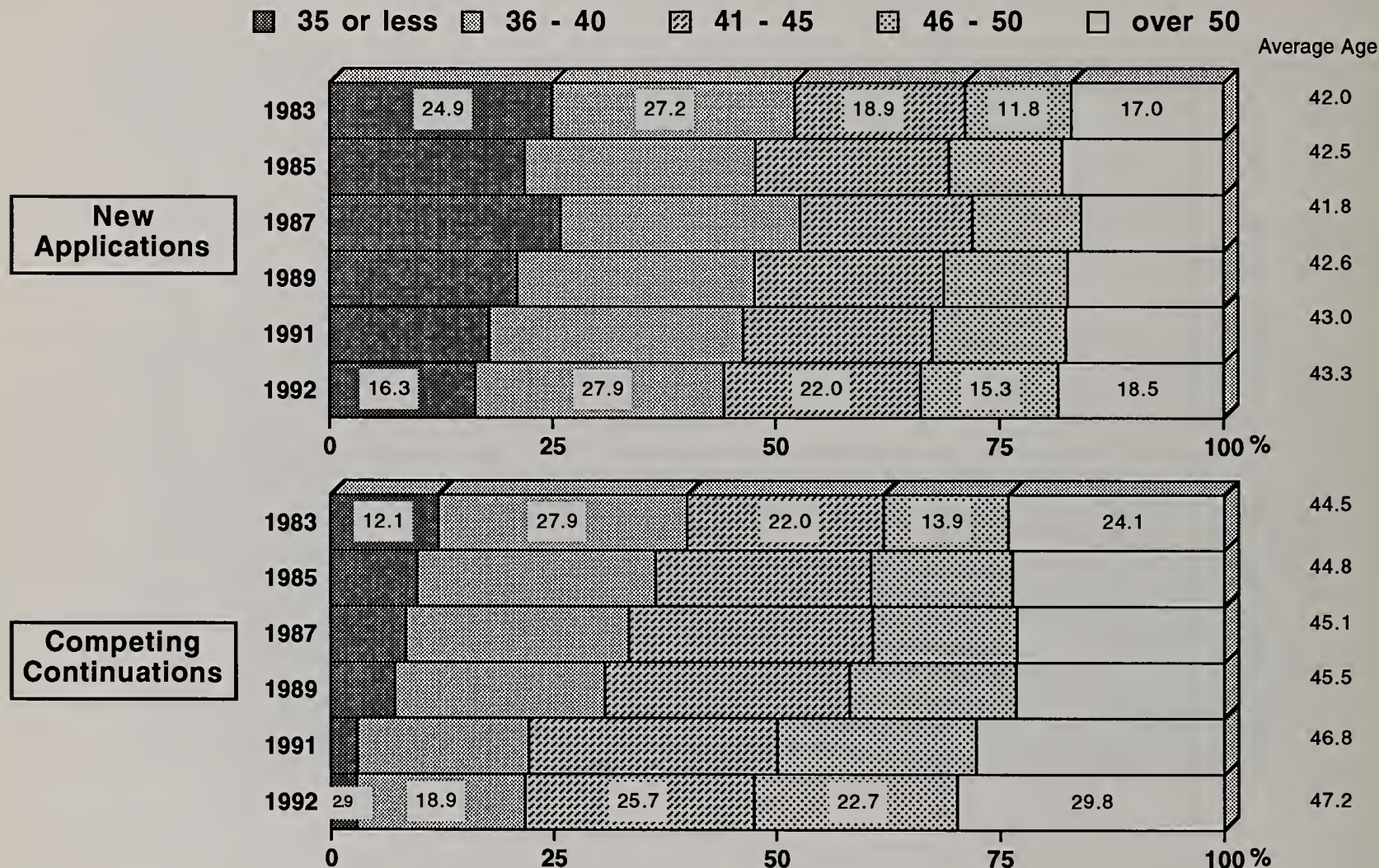
There is a slight increase in applicants 36 to 45 years of age, while the proportion over 45 has grown even more -- from 31.4 percent in 1983 to 39.5 percent in 1992. This gradual shift in age distribution is also reflected in a 1.8 year increase in the average age of applicants since 1983 (from 42.7 to 44.5).

Year	Number	Number with Age	Percentage of Applications					Average Age
			35 or Less	36 - 40	41 - 45	46 - 50	50 and Older	
1983	15,065	12,926	21.3	27.4	19.8	12.4	19.0	42.7
1984	15,009	14,290	20.3	27.4	20.7	12.7	18.9	42.8
1985	16,432	15,951	18.3	26.2	22.3	13.5	19.6	43.2
1986	15,699	15,273	18.2	26.5	22.4	13.7	19.2	43.1
1987	15,511	15,057	20.0	26.3	21.9	13.5	18.4	42.9
1988	16,063	15,709	19.5	26.3	21.9	14.2	18.1	43.0
1989	16,828	16,429	16.9	25.8	22.9	15.2	19.1	43.5
1990	17,807	15,516	15.5	25.5	21.9	16.8	20.4	43.8
1991	16,674	16,124	13.2	25.6	23.2	17.2	20.8	44.2
1992	17,261	17,037	12.2	25.2	23.1	17.5	22.0	44.5
1983-92	+2,196	+4,111	-9.1	-2.2	+3.3	+5.1	+3.0	+1.8

A similar age trend is found in both new and competing continuation applicants, and in men's and women's applications.

It should also be noted that the age of principal investigators submitting these applications has been recorded in the IMPAC data system since 1979. During this period, nonresponse to this item has ranged from 2 to 6 percent excepting 1983 (14 percent due to a data processing error) and 1990 (13 percent).

Age* Distribution of Principal Investigators for DRG-Reviewed Competing R01, R23, and R29 Applications** by Type of Application, FY1983-1992†



*Age computed as of October of given year.

**Competing applications summarized by requested start date or fiscal year of funds. †Selected years.

Source: NIH, DRG, ISB, SAES

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New and competing continuation R01, R23, and R29 applications, both initial and amended, all confirm the decline in the proportion of applications from investigators 35 years or younger. In new applications, this proportion has declined 8.6 percentage points since 1983 -- from 24.9 to 16.3 percent in 1992; in competing continuations, 9.2 points, from 12.1 percent in 1983 to 2.9 in 1992. Amendments show a lower but also declining percentage of applications from the 35-or-under age group. Both new and competing continuation applications showed steady declines in the 26-to-30 age group -- 3.8 to 1.5 percent for new applications and 0.5 to 0.1 percent for competing continuations. In FY 1992, applicants between 26 and 30 years of age submitted only 82 new R01 applications -- a significant decline from the 328 submitted in 1983.

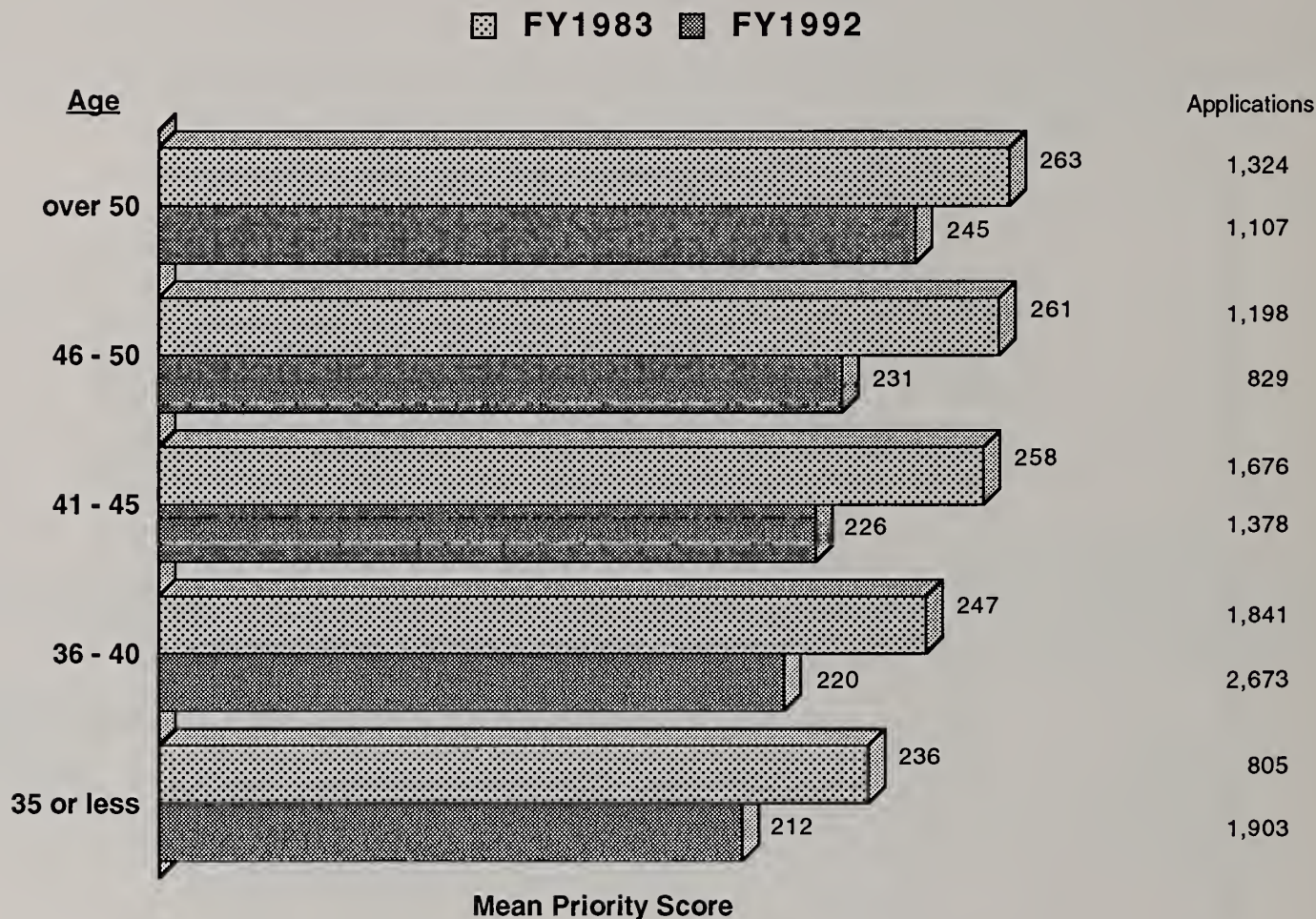
Percentages of R01, R23, and R29 applications from the 35-or-under age group are as follows:

	<u>New Applications</u>			<u>Competing continuations</u>		
	Total	Non-Amend.	Amend.	Total	Non-Amend.	Amend.
1983....	24.9	25.7	21.9	12.1	13.2	9.5
1985....	21.9	22.7	19.1	9.7	10.2	8.3
1987....	25.9	28.5	17.6	8.4	9.7	5.6
1989....	21.0	21.6	19.3	7.2	8.4	5.1
1991....	17.9	18.9	15.6	3.0	3.0	3.0
1992....	16.3	17.2	14.3	2.9	3.4	2.2
1983-92...	-8.6	-8.5	-7.6	-9.2	-9.8	-7.3

As the number of younger R01 applicants declined, applications for New Investigator Research Awards (R23) and FIRST Awards (R29) increased. Although some of the decline in younger R01 applicants may be attributed to shifts to the R29 program, the number of younger research applicants still continues to decline.

	<u>1983</u>	<u>1985</u>	<u>1987</u>	<u>1989</u>	<u>1991</u>	<u>1992</u>	<u>Difference</u> <u>1983-1992</u>
R01 (New)							
26-30 yrs.....	328	307	166	98	73	82	-246
31-35 yrs.....	1,851	2,041	1,250	1,261	1,031	1,014	-837
R23/R29	1,006	1,171	2,680	1,759	1,749	1,742	+736

Mean Priority Scores of DRG-Reviewed New R01 Applications* by Age of Principal Investigator, FY1983 and FY1992



*DRG approved/rated applications summarized by requested start date or fiscal year of funds;
excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

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Ironically, it is the shrinking 26-to-35 age group that receives the best scores and is the most successful in obtaining NIH funding. This age group primarily submits new applications; few applicants for competing continuations are in the 26-to-30 age group. These lower scores translate into substantially higher success rates for younger principal investigators' new applications. For new applications, FY 1992 rates range from a high of 31.7 percent in the 26-to-30 age group to only 12.0 for applicants in the 66-to-78 age group. In the case of competing continuations, however, applicants aged 36 to 50 average better scores than applicants 50 years or over.

With the exception of those investigators in the 61-to-65 age group, competing continuation applicants over 55 clearly have declining success rates. Despite nearly uniform improvement in mean priority scores, there has been a general decline in success rates for all age groups over the decade.

Age	Mean Scores				Success Rates*			
	New		Competing Continuation		New		Competing Continuation	
	1983	1992	1983	1992	1983	1992	1983	1992
26-30.....	228	209	**	**	35.3	31.7	**	**
31-35.....	237	212	201	176	30.1	27.5	51.7	50.4
36-40.....	247	220	207	190	25.7	22.9	46.3	43.8
41-45.....	258	226	207	187	21.2	19.9	48.4	43.9
46-50.....	261	231	209	191	20.7	18.3	51.0	41.3
51-55.....	261	238	211	194	19.9	15.9	45.5	40.5
56-60.....	262	245	212	204	15.4	15.9	49.0	33.9
61-65.....	278	254	214	200	12.7	13.1	45.4	39.0
66-78.....	254	262	217	197	29.0	12.0	48.4	32.5

By fiscal year of funds or requested start date.

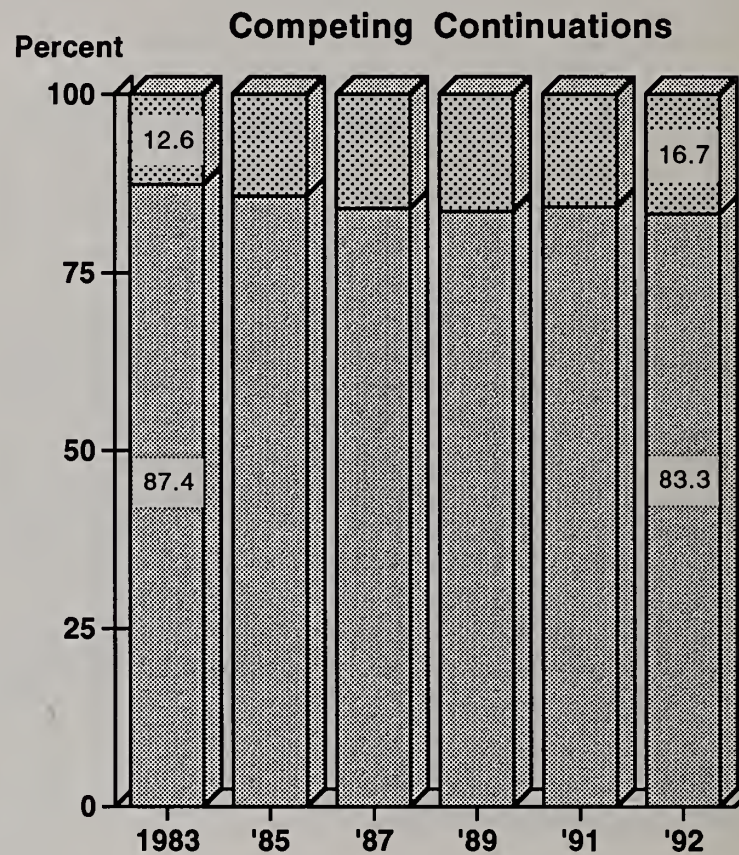
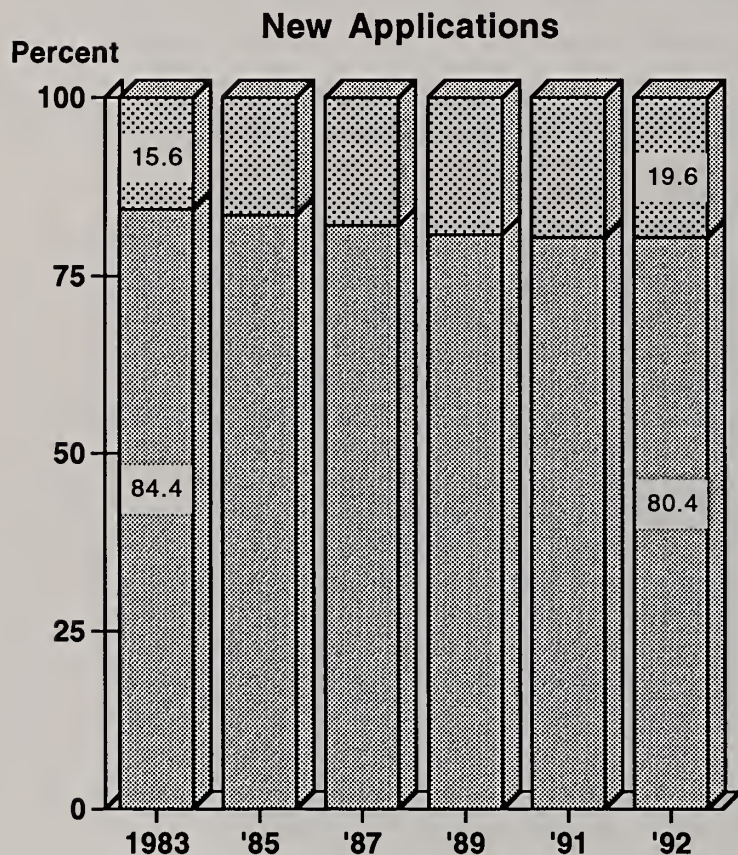
*See Technical Note 13, page xii.

**Fewer than 50 applications rated.

These data strongly suggest that priority scores and success rates for new applications vary according to the age of the investigator; in general, the younger the investigator the better the priority score and success rate.

Percentage of DRG-Reviewed Competing R01 Applications* by Type and Applicant Gender, FY1983-1992†

■ Men ■ Women



Total Number: 7,950 9,869 7,301 9,509 9,090 9,460

2,941 3,904 4,294 4,647 4,890 4,506

*Excludes withdrawals and supplements, and those applications where gender was not reported. Includes original and amended applications summarized by fiscal year of initial review.

†Selected years.

Source: NIH, DRG, ISB, SAES

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R01 competing applications reviewed by DRG study sections have shown a steady annual increase in the proportion of women applicants, from 14.8 percent of 1983 applications to 18.7 percent in 1992. Growth was relatively even throughout the decade, with an increase of 2.7 percentage points from 1983 to 1988, and 1.2 percentage points from 1988 to 1992. Increases in the proportion of applications from women appeared in both new and competing continuation applications, but with the expected 3- to 4-year lag among competing continuations. The percentage of female applicants for competing continuations peaked in 1988 (17.4 percent), and then declined to 16.7 in 1992.

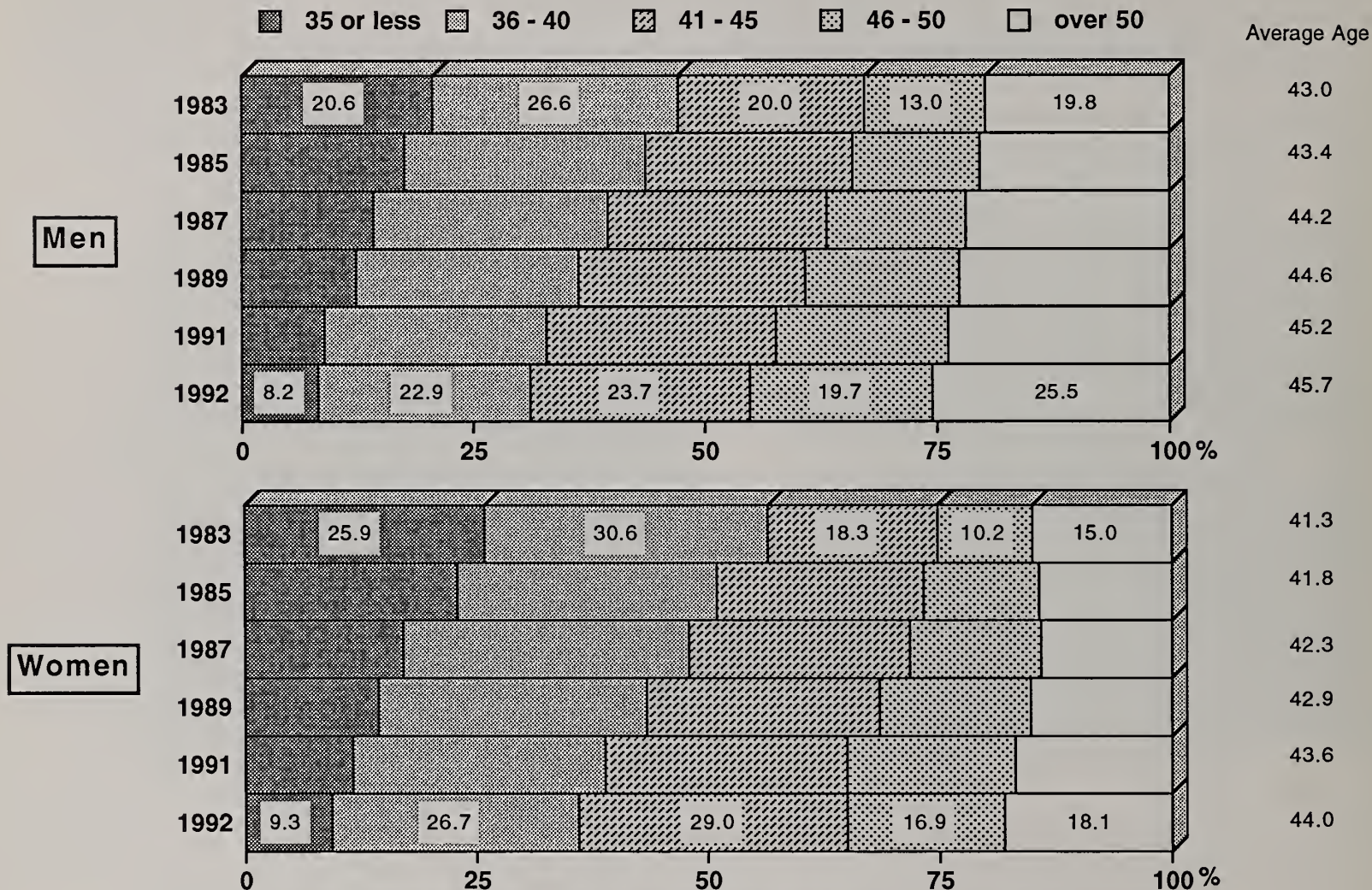
<u>Year</u>	<u>Total</u>		<u>New</u>		<u>Competing Continuations</u>	
	<u>Number*</u>	<u>%W</u>	<u>Number*</u>	<u>%W</u>	<u>Number*</u>	<u>%W</u>
1983.....	10,891	14.8	7,950	15.6	2,941	12.6
1984.....	13,344	15.7	9,379	16.8	3,965	13.0
1985.....	13,764	15.8	9,860	16.5	3,904	14.3
1986.....	12,825	16.0	8,462	16.6	4,363	15.0
1987.....	11,595	17.2	7,301	17.9	4,294	16.0
1988.....	12,127	17.5	7,724	17.6	4,406	17.4
1989.....	14,156	18.3	9,509	19.2	4,647	16.4
1990.....	13,290	18.2	9,132	19.2	4,158	16.1
1991.....	13,980	18.3	9,090	19.6	4,890	15.7
1992.....	13,966	18.7	9,460	19.6	4,506	16.7

*Number with gender reported; summarized by fiscal year of IRG review.

Amendments as a percentage of reviewed R01 applications were as follows:

	<u>New</u>		<u>Competing Continuations</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
1983.....	20.2	18.8	27.5	29.6
1985.....	23.2	23.4	24.8	28.1
1987.....	25.1	25.9	29.8	31.5
1989.....	27.6	30.0	34.4	35.6
1991.....	33.1	34.2	41.6	39.0
1992.....	28.7	29.9	39.7	40.3

Age and Gender Distribution of Principal Investigators for DRG-Reviewed Competing R01 Applications,* FY1983-1992†



*Competing applications summarized by requested start date or fiscal year of funds. Excludes applications with age and/or sex unknown. †Selected years.
Source: NIH, DRG, ISB, SAES

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The decline in the proportion of R01 applications submitted by younger investigators (35 years or less) appears in both sexes. Among men, the proportion declined by 12.4 percentage points, from 20.6 percent in 1983 to 8.2 percent in 1992. Applications from younger women showed a higher but also more rapidly declining proportion (16.6 percentage points), from 25.9 percent in 1983 to 9.3 percent in 1992.

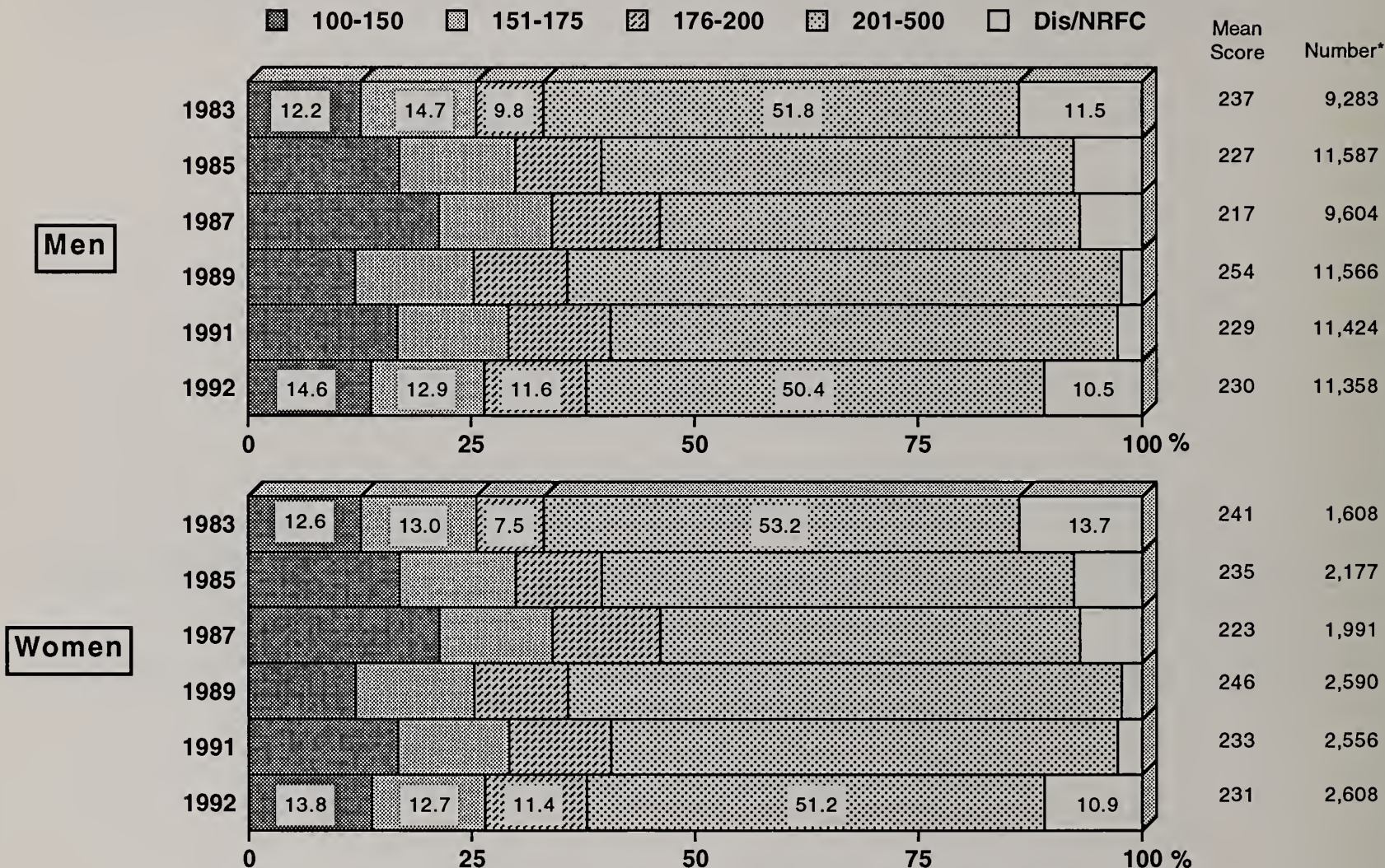
<u>Year</u>	<u>Men</u>		<u>Women</u>	
	<u>Number</u> [*]	<u>% 35 or less</u>	<u>Number</u> [*]	<u>% 35 or less</u>
1983...	9,550	20.6	1,691	25.9
1984...	10,615	18.9	1,930	26.9
1985...	11,506	17.6	2,085	23.0
1986...	10,974	17.8	2,142	21.8
1987...	9,563	14.2	1,934	17.1
1988...	9,938	13.0	2,059	17.5
1989...	10,941	12.3	2,375	16.4
1990...	11,111	11.1	2,496	13.3
1991...	11,518	8.9	2,520	11.6
1992...	11,405	8.2	2,584	9.3
1983-92...	+1,855	-12.4	+893	-16.5

^{*}Applications with both age and gender recorded.

The proportion of applications submitted by the 41 to 45 age group grew for both sexes. From 1983 to 1992, the average age of an applicant increased by nearly three years for both sexes. Over the decade, the decline in under-35 applicants is particularly steep, regardless of gender: the modal age group of under-40 has now shifted from 36 to 45 years of age.

As seen elsewhere before, the pattern in mean priority scores by age group indicates that young scientists get the best scores. This general decline in the number of younger scientists, the "greying of research," is a worrisome trend.

DRG Study Section Action on Competing R01 Applications* by Gender** of Applicant, FY1983-1992†



*Excludes withdrawals and supplements. Includes original and amended applications summarized by fiscal year of initial review. **Based on applications reporting gender. †Selected years.
Source: NIH, DRG, ISB, SAES

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The proportion of R01 applications rated as well as the proportion in the potentially fundable range followed much the same pattern for female and male applicants. From 1983 to 1991, non-rated applications from women declined by 11 points, from 13.7 to 2.7 percent. For men, the percentage of non-rated applications dropped by 9.4 percentage points, from 11.5 percent to 2.1 percent. The advent of the NRFC classification in 1992, as noted elsewhere, substantially reversed this trend.

At the same time, applications with the best scores (100-175) showed some variability over the decade, ranging from 26.9 (1983) to 39 (1987) percent for men, and from 25.3 (1989) to 35.6 (1986) percent for women. For most of the decade, a smaller proportion of women's applications received scores of 175 or better. The data below suggest that this is primarily in the area of competing continuations. The percentage of reviewed applications with scores 175 or better* follow:

<u>Year</u>	<u>Total</u>		<u>New</u>		<u>Competing Continuations</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
1983.....	26.9	25.6	21.1	21.8	42.1	38.3
1984.....	30.5	26.9	22.6	20.2	48.3	47.4
1985.....	32.8	30.0	24.9	24.0	52.5	47.6
1986.....	37.3	35.6	28.1	27.7	54.7	52.4
1987.....	39.0	34.2	28.4	25.2	56.7	51.2
1988.....	33.9	31.3	24.3	21.5	50.7	48.8
1989.....	25.0	25.3	18.1	20.9	38.6	36.0
1990.....	29.0	27.0	22.1	22.2	43.5	39.4
1991.....	32.5	29.2	23.0	23.6	45.5	42.4
1992.....	27.5	26.5	20.3	21.3	42.0	39.2

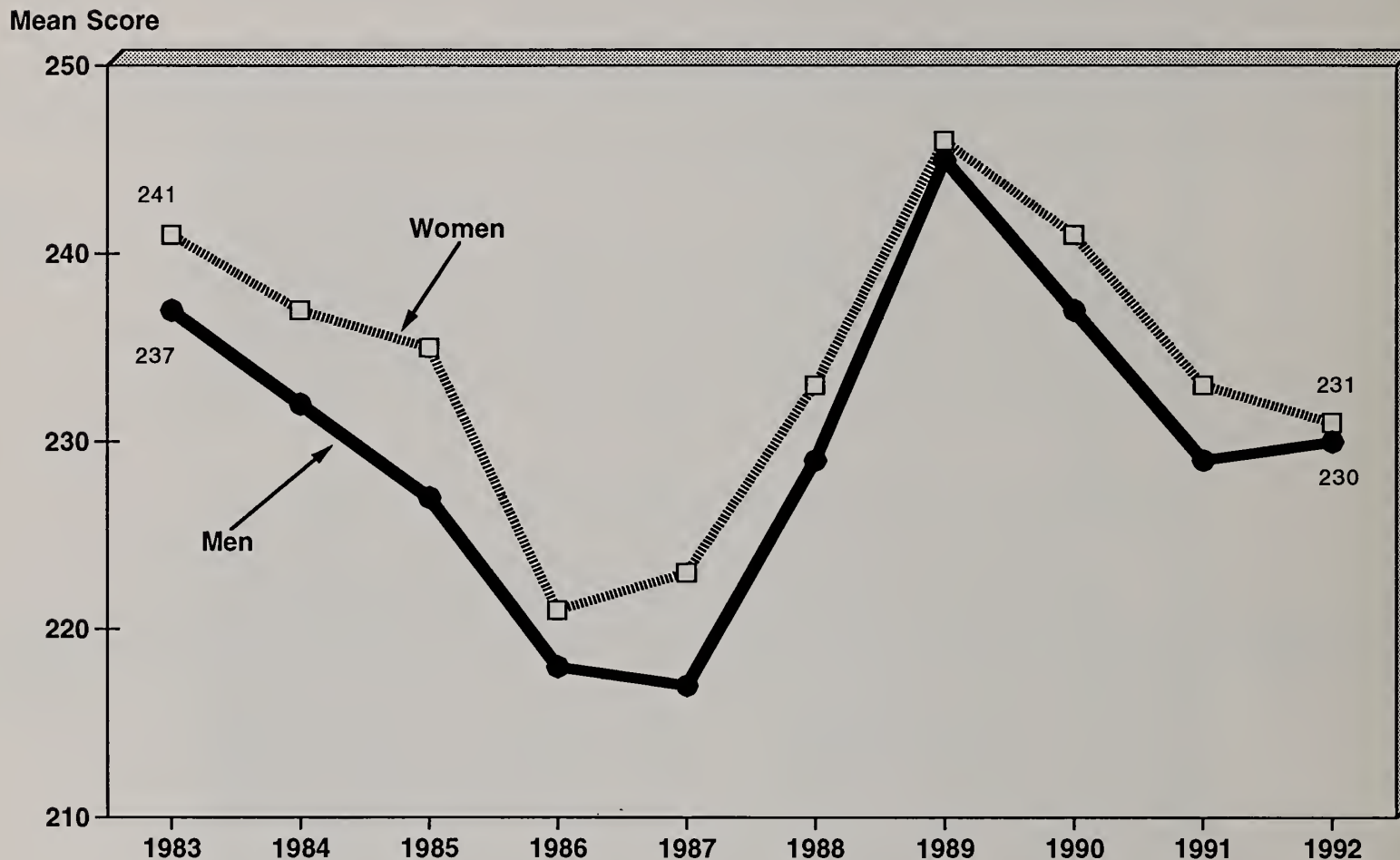
Initial and amended applications summarized by fiscal year of IRG review.

Female applicants have a much lower percentage of M.D. (or joint M.D./Ph.D.) degrees -- 14.2 versus 27.0 percent for men in 1992 -- and female Ph.D.'s enjoy a better success rate than female M.D.'s.

	<u>Applications</u>		<u>Mean Scores</u>		<u>Success Rates</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
M.D. *	27.0	14.2	215	226	26.3	22.7
Ph.D.	72.2	84.7	214	218	27.8	28.1
Other or NA...	0.8	1.1				

*Includes joint M.D./Ph.D.; summarized by fiscal year of funds or requested start date from award rate file.

Mean Priority Scores of DRG-Reviewed Competing R01 Applications* by Gender of Applicant, FY1983-1992



*Includes original and amended applications summarized by fiscal year of initial review; excludes withdrawals and supplements, and applications where gender was not reported.
Source: NIH, DRG, ISB, SAES

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Through the decade, women's R01 application scores nearly matched those of men. (In later years, though, men's competing continuation applications have fared somewhat better.) Score differences ranged from 1 to 8 points.

<u>Year</u>	<u>Total</u>		<u>New</u>		<u>Competing Continuation</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
1983...	237	241	250	252	208	208
1984...	232	237	248	250	200	202
1985...	227	235	242	248	194	199
1986...	218	221	235	237	188	188
1987...	217	223	237	240	186	192
1988...	229	233	248	255	196	196
1989...	245	246	263	259	211	214
1990...	237	241	253	253	204	211
1991...	229	233	246	246	201	205
1992...	230	231	244	241	203	208

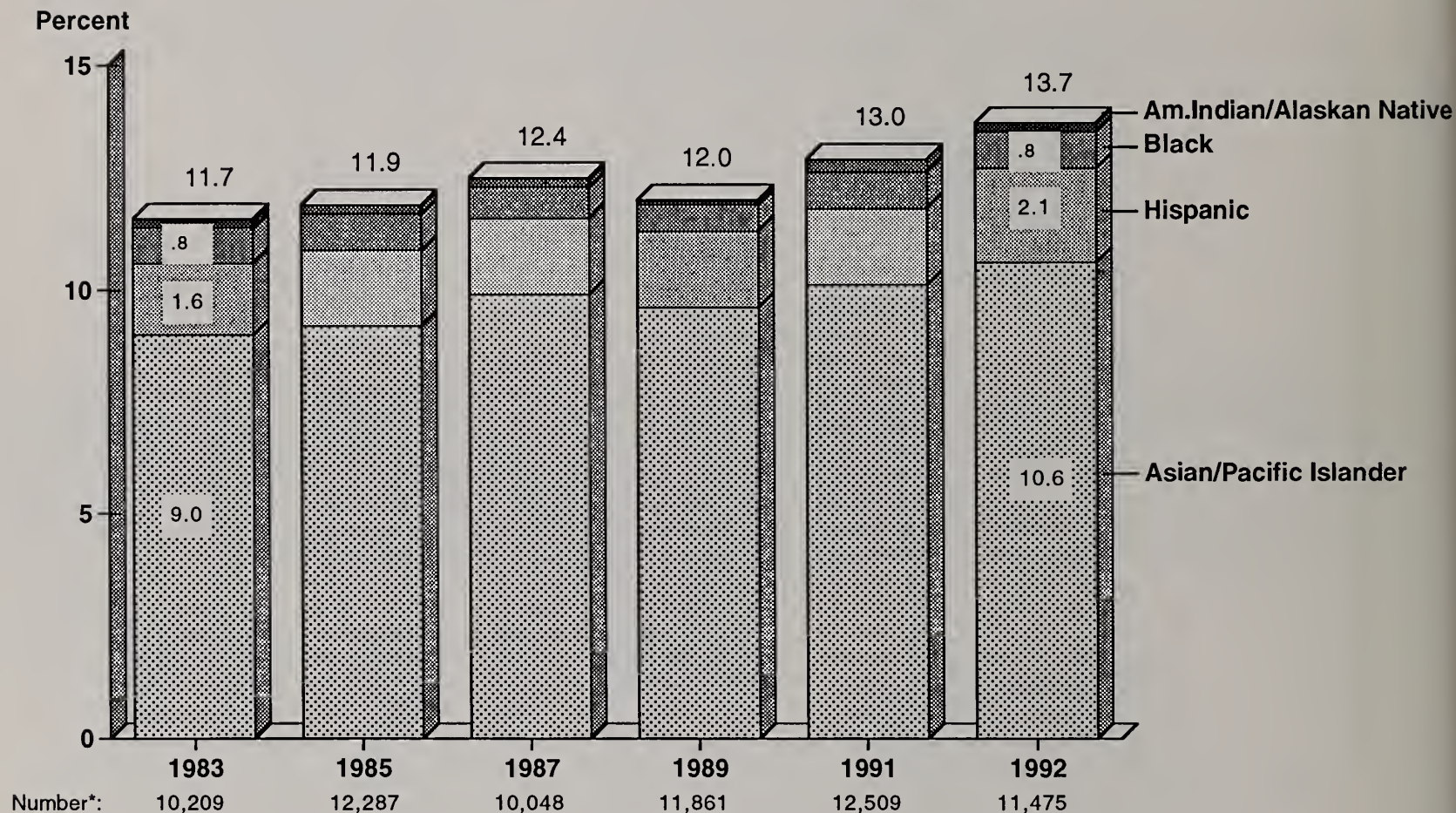
Summarized by fiscal year of IRG review.

Study sections are grouped in review sections, primarily by subject matter. In 1992, the largest portion of women's R01 applications were reviewed by the Behavioral/Neurosciences Review Section (23.4 percent), and the Physiological Sciences Review Section (18.7 percent); the smallest portion of these applications were reviewed by the Biomedical Sciences Review Section (10.1 percent) and the Immunology, Virology, and Pathology Review Section (11.9 percent). The smallest portion of men's applications went to the Immunology, Virology and Pathology Review Section (11.6 percent), with all other review sections (except Special Review Section) to 18 percent. Women averaged scores that were equal to or better than men's on applications reviewed by the Biomedical Science Review Section but worse than men's in all others. The distribution of 1992 reviewed applications, mean scores, and success rates are as follows*:

<u>Review Section</u>	<u>Percentage of Applications</u>		<u>Mean Scores</u>		<u>Success Rates</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
Behav/Neurosciences.....	17.6	23.4	265	271	28.0	27.4
Biological Sciences.....	16.4	17.7	237	246	29.6	28.2
Physiological Sciences..	17.7	18.7	238	239	29.0	29.9
Clinical Sciences.....	18.1	17.8	257	263	24.6	26.5
Biomedical Sciences.....	17.5	10.1	244	237	25.7	29.9
Special.....	1.1	0.4	265	268	27.3	23.7
Immunology/Virology.....	11.6	11.9	241	296	38.8	33.3
Total	100.0	100.0	253	258	27.3	27.3

*From success rate file by fiscal year of funds or requested start date.

Minority Representation Among Principal Investigators for DRG-Reviewed Competing R01 Applications,* FY1983-1992†



*Competing applications summarized by requested start date or fiscal year of funds from success rate file.
Encrypted data captured since May 1981. Number with response shown. †Selected years.
Source: NIH, DRG, ISB, SAES

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The proportion of R01 applications from racial/ethnic minorities has grown very slowly, increasing by only 2 percentage points between 1983 and 1992, from 11.7 to 13.7 percent of all applications with ethnic data provided. (The ethnic terms used here correspond to the choices provided on PHS Form 398, September, 1991 revision of "Personal Data on Principal Investigator/Program Director". A further discussion may be found in the Glossary, pp. 122f.)

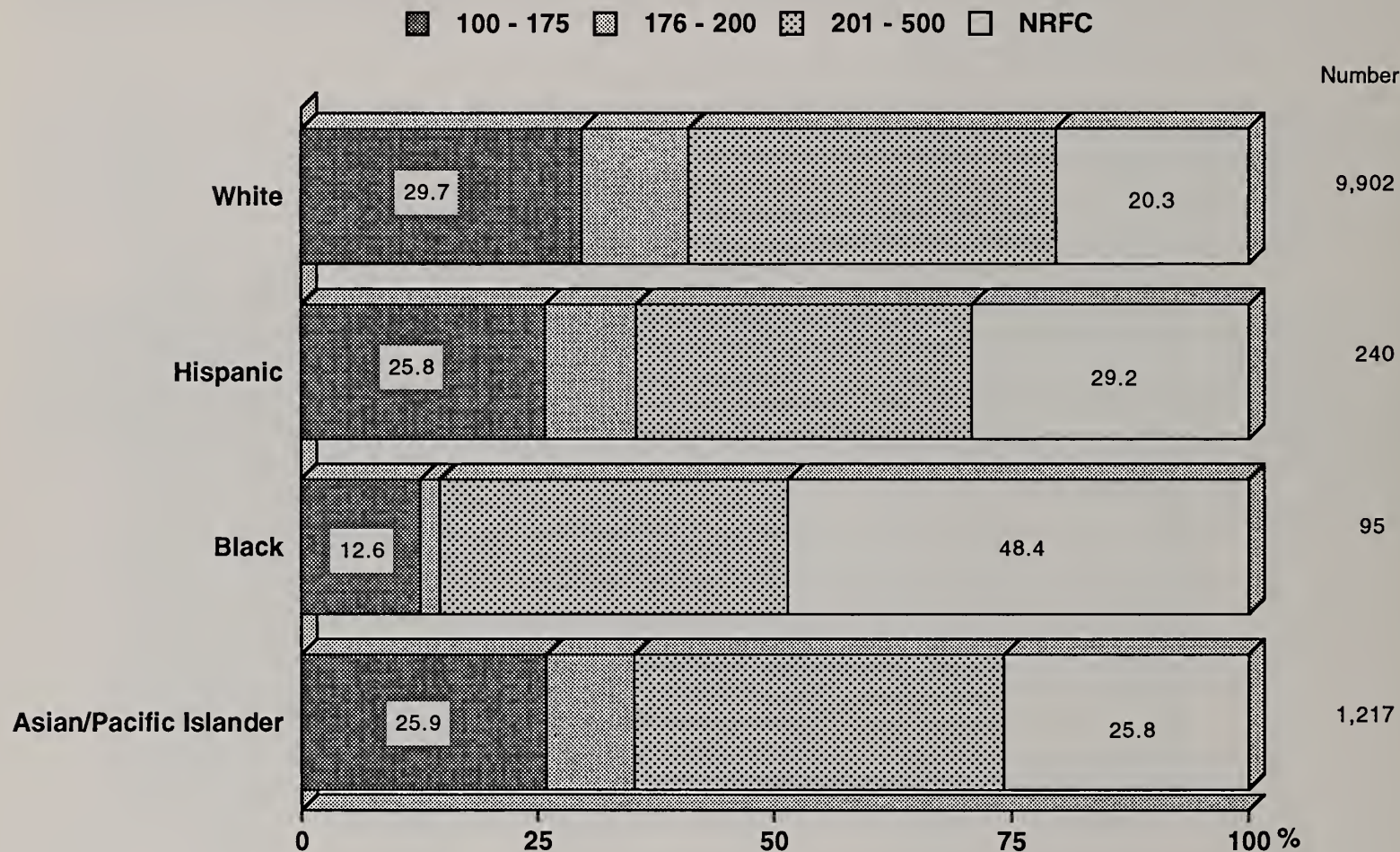
The relative ordering of proportions of the four kinds of minority groups also remains unchanged. Applicants of Asian/Pacific Island origin consistently submit more than three times as many applications as all other minority groups combined -- 10.6 percent of total R01 applications reporting race in 1992. It should also be noted that it is largely the growth in their group's submissions which has fueled the overall increase. The next largest group, applicants of Hispanic origin, submitted 1.6 percent of R01 applications in 1983 and 2.1 percent in 1992. The proportion submitted by Black applicants remains under 1 percent, and shows little variability. American Indian/Alaskan origin applicants make up the smallest group, having stabilized at 0.2 percent.

As noted, the race/ethnic origin of principal investigators seeking NIH support is requested in the application form, and subsequently stored in encrypted form in the IMPAC data system. Providing this information is voluntary and it is separated from the grant application prior to review. Response to this item has been 78 to 91 percent since 1983. (In 1983, racial information was recorded for only 72 percent of applications due to a data processing error.) Response rates had generally been on the rise through 1991, only to drop sharply in 1992. Despite the 20 percent nonresponse to this item, captured data are reported since they are the only available indication of the number and priority scores of applications submitted by minorities for DRG review. Until response to this item improves, data on race are an approximation.

Response Rate to Ethnicity Question

1983	71.5
1985	79.7
1987	78.3
1989	85.4
1991	90.7
1992	81.6

DRG Study Section Action on Competing R01 Applications by Race/Ethnic Origin of Investigator,* FY1992**



*With response to race/ethnic origin.

**Competing applications summarized by requested start date or fiscal year of funds.

Source: NIH, DRG, ISB, SAES

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From the time racial data for principal investigators first became available in 1982, all racial/ethnic groups have shown similar trends in their proportions of applications in the 100-175 priority-score range and in their proportion of approvals, though the proportions themselves have differed. The groups' proportions in the 100-175 priority-score range have also ranked about the same relative to each other. The impact of the NRFC classification has also been sizeable.

There have been clear differences among the racial groups. In 1992, R01 applications which were classified as NRFC ranged from 20.3 percent for Whites to 48.4 percent for Black applicants. The proportion of reviewed applications from minorities with scores between 100-175 ranged from 25.9 percent for Asian/Pacific Islanders to 12.6 percent for Blacks.

	<u>Percentage Disapproved*/NRFC</u>							<u>Percentage 100-175*</u>					
	<u>1983</u>	<u>1985</u>	<u>1987</u>	<u>1989</u>	<u>1991</u>	<u>1992</u>		<u>1983</u>	<u>1985</u>	<u>1987</u>	<u>1989</u>	<u>1991</u>	<u>1992</u>
Asian/Pac. Is.	14	11	8	4	3	26		23	29	36	21	27	26
Black	29	24	19	10	8	48		16	14	20	10	15	13
Hispanic	18	7	7	4	4	29		24	31	30	24	25	26
White	12	8	5	3	2	20		28	34	41	26	33	30

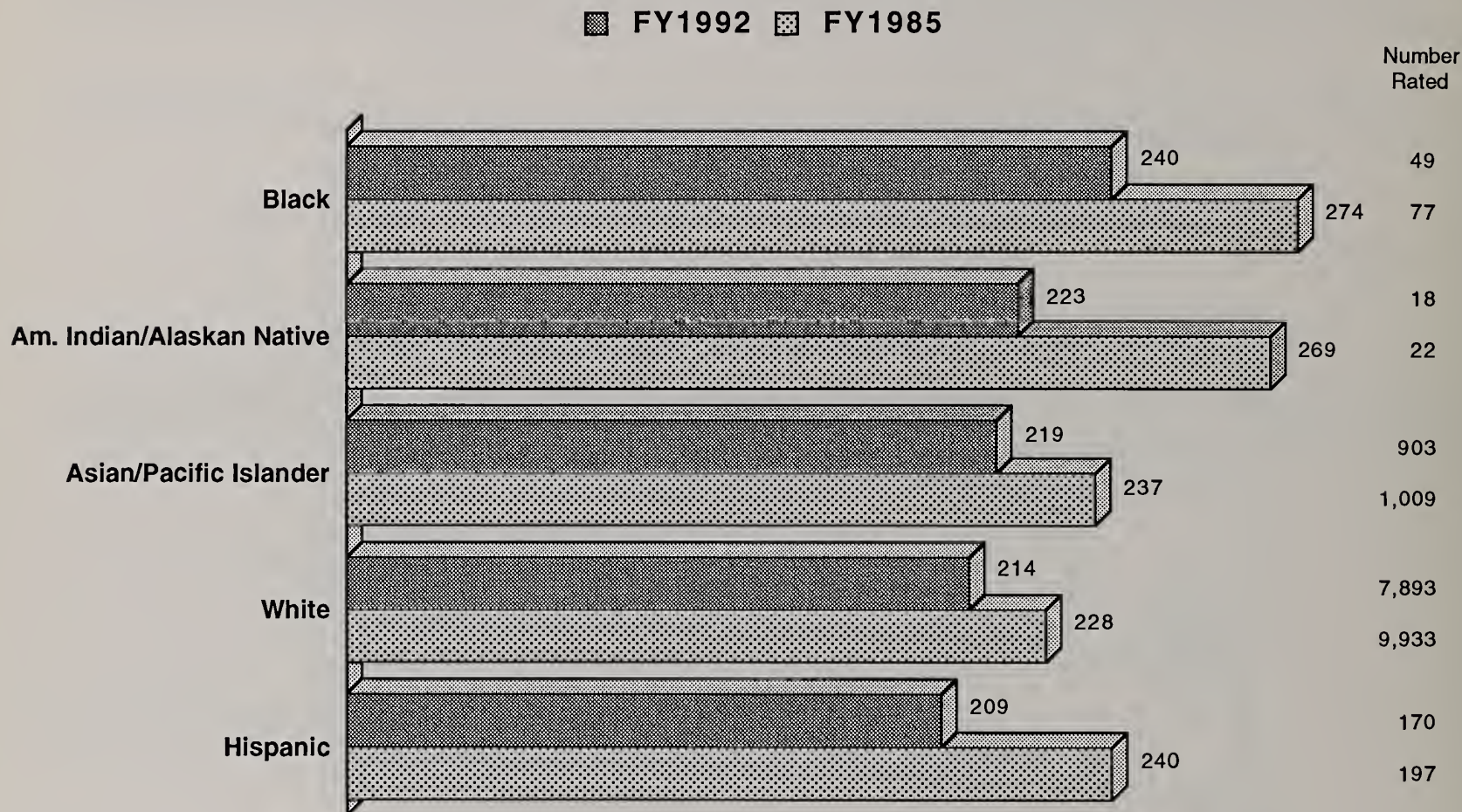
*Percentage of reviewed applications summarized by fiscal year of funds or requested start date from success rate file.

Minority applicants show substantially different degree profiles. Applicants of Hispanic origin clearly have the highest proportion of M.D.'s -- double those of other minorities, and occasionally over 40 percent. Applicants of Asian/Pacific Island origin report the highest proportion with Ph.D.'s -- between 79 and 84 percent.

	<u>Asian/ Pacific Is.</u>		<u>Black</u>		<u>Hispanic</u>		<u>White</u>	
	<u>M.D.</u>	<u>Ph.D.</u>	<u>M.D.</u>	<u>Ph.D.</u>	<u>M.D.</u>	<u>Ph.D.</u>	<u>M.D.</u>	<u>Ph.D.</u>
1983	19.5	79.3	22.5	71.6	40.5	58.1	28.0	70.1
1985	16.4	81.3	23.1	72.7	39.4	58.9	26.0	71.9
1987	18.9	79.9	25.6	67.1	42.3	56.7	25.7	72.2
1989	17.7	81.6	21.4	77.4	41.2	56.2	25.9	72.7
1991	19.1	80.0	26.6	69.7	38.9	58.4	26.1	72.7
1992	16.6	83.2	20.2	74.7	43.4	55.4	25.1	74.1

(M.D.'s include joint M.D./Ph.D. Other degrees are not shown.)

Mean Priority Scores for DRG-Reviewed Competing R01 Applications* by Race/Ethnic Origin of Principal Investigator, FY1985 and FY1992



*Competing applications summarized by requested start date of fiscal year of funds.
Source: NIH, DRG, ISB, SAES

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Hispanics and Asian/Pacific Islanders have better mean scores than Blacks and American Indian/Alaskan applicants*. The *mean scores* of approved R01 applications submitted by members of racial/ethnic minorities summarize relationships previously seen in their score distributions (pp. 82f.).

	1992	
	<u>Total</u>	<u>Competing</u>
	<u>New</u>	<u>Continuation</u>
	**	**
Am. Ind./Alaskan Native.....	223	
Asian/Pacific Islander	219	233
Black.....	240	250
Hispanic.....	209	222
White.....	214	228
Total.....	214	228
		191

Although numerous factors contribute to the differences in scores, the small number of applications from all minority groups except Asian/Pacific Islanders and the lack of complete data concerning race/ethnic origin make conclusive analysis impossible. The following *success rates* are based on reviewed applications recorded in the success rate file and generally agree with the trends the mean scores suggest.

	1992	
	<u>Total</u>	<u>Competing</u>
	<u>New</u>	<u>Continuation</u>
	**	**
Am. Ind./Alaskan Native.....	28.6	
Asian/Pacific Islander.....	23.6	17.1
Black.....	12.6	7.8
Hispanic.....	24.6	16.3
White.....	27.8	20.4
Total.....	27.3	20.3
		41.6

*By fiscal year of funds or requested start date from success rate file.

**Fewer than 15 applications.

5. APPLICANT INSTITUTION RELATED TO STUDY SECTION ACTION

Rank of institution

Distribution of applications

Study section actions: Score distributions

Type of institution related to mean priority scores

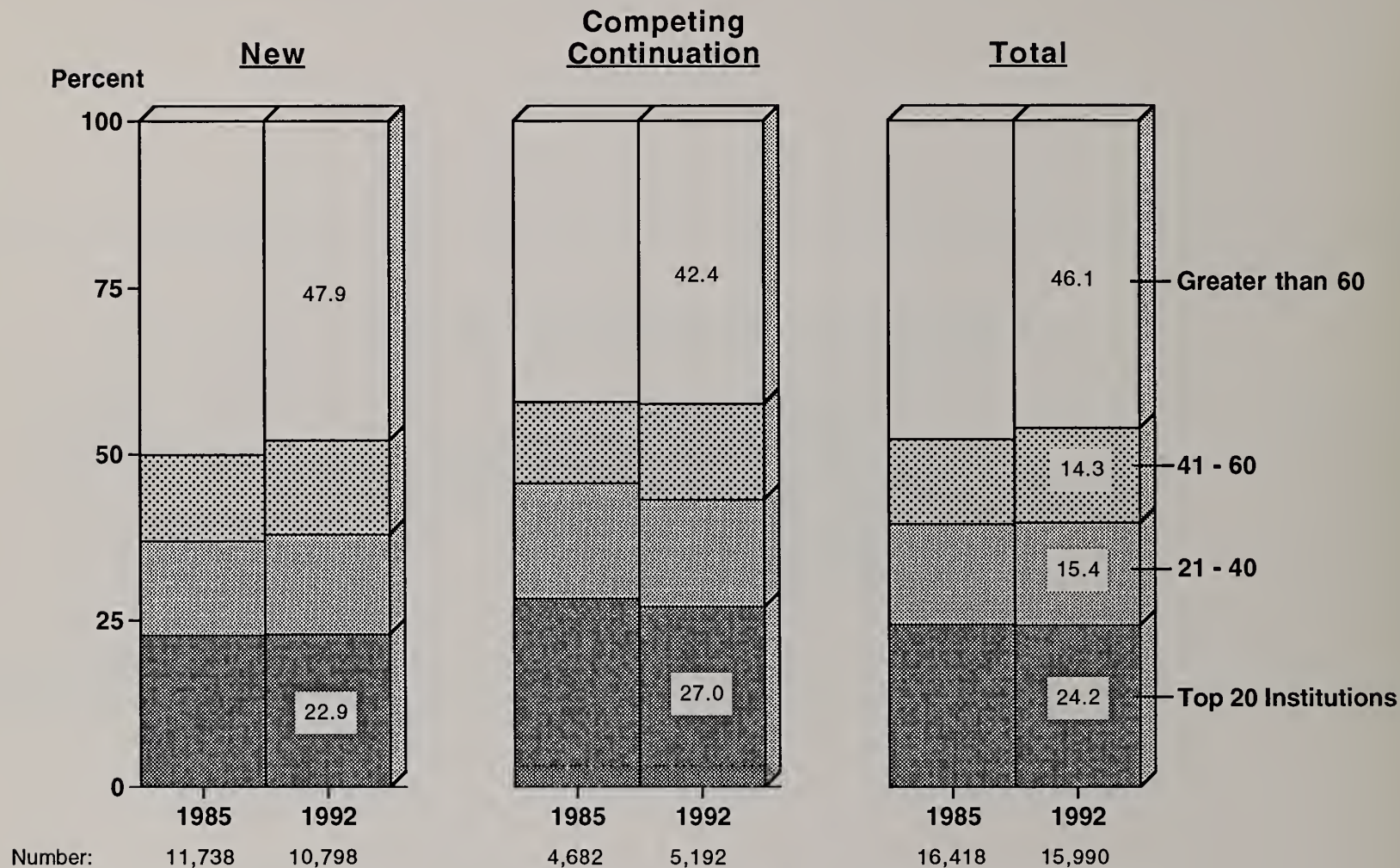
Basic versus clinical departments (higher education)

Mean priority score trends

Department of applicant (higher education)

Mean priority score trends

Distribution of DRG-Reviewed Competing R01 Applications* by Institution Rank,** FY1985 and FY1992



*Excludes withdrawals and supplements. Includes original and amended applications summarized by fiscal year of initial review. **Institutions ranked by total R01 dollar support in indicated year.
Source: NIH, DRG, ISB, SAES

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About one-fourth of the R01 applications reviewed by DRG study sections in 1992 were from the top 20 grantee institutions (ranked by R01 dollar support within that year). They submitted 3,876 applications or an average of 194 per institution. The second 20 institutions submitted 15 percent -- 2,459 applications or 123 per institution. Therefore, in 1992, the top 20 institutions submitted 57.6 percent more applications than the next 20. The top 40 institutions also submitted a large share of competing continuations -- 45.6 percent in 1985 and 43.1 percent in 1992.

Although the proportion of applications from the top institutions has remained relatively stable since 1985, both the **total number** and the average number per institution have changed as follows:

Institution Rank	1985		1992		Change 1985-1992	
	No.	Avg.*	No.	Avg.*	No.	Avg.*
1-20	3,982	199	3,876	194	-106	-5
21-40	2,478	124	2,459	123	-19	-1
41-60	2,098	105	2,281	114	+183	+9
61-100	2,719	68	2,704	68	-15	0
over 100	5,141		4,670		-471	

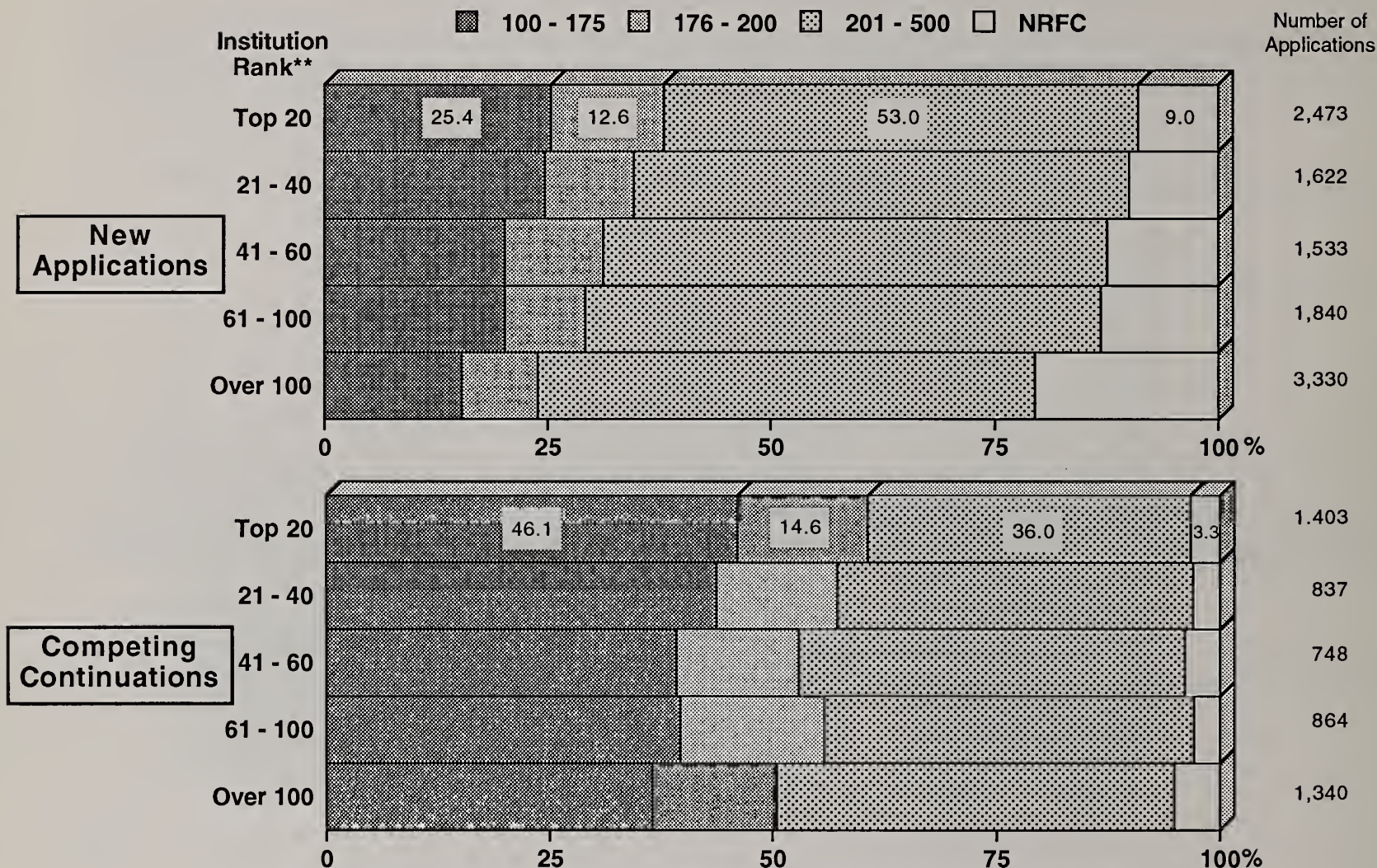
By fiscal year of IRG review.

*Average per institution.

Some of the increase since 1985 is due to growth in **amended applications**, particularly for the top institutions. In the top 20, for example, amendments were 23 percent of total applications in 1985, 31 percent in 1992. The average number of nonamended versus amended R01 applications per institution is as follows:

Institution Rank	Nonamended Applications			Amendments		
	1985	1992	1985-92	1985	1992	1985-92
1-20	154	129	-25	45	61	+16
21-40	95	77	-18	23	41	+18
41-60	78	69	-9	27	38	+11
61-100	51	43	-8	35	23	-12

DRG Study Section Action on Competing R01 Applications* by Type and Institution Rank, FY1992



*Excludes withdrawals and supplements. Includes original and amended applications summarized by fiscal year of initial review.

**Institution ranked by total R01 dollar support in FY1992.

Source; NIH, DRG, ISB, SAES

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In addition to submitting more applications, the top-ranked institutions submitted a higher proportion of applications that fared better in study section review. In 1992, the percentage of new applications from the top 20 institutions which received scores of 100-175 was 25.4 percent, versus 15.3 percent from institutions ranked after the top 100. (A total of 827 institutions submitted R01 applications for DRG review.) Corresponding figures for 1992 competing continuations with scores of 100-175 were 46.1 percent for the top 20 versus 36.5 percent for those ranked after the top 100. All groups have shown higher (poorer) scores since 1985, with the greatest increase occurring in competing continuation scores.

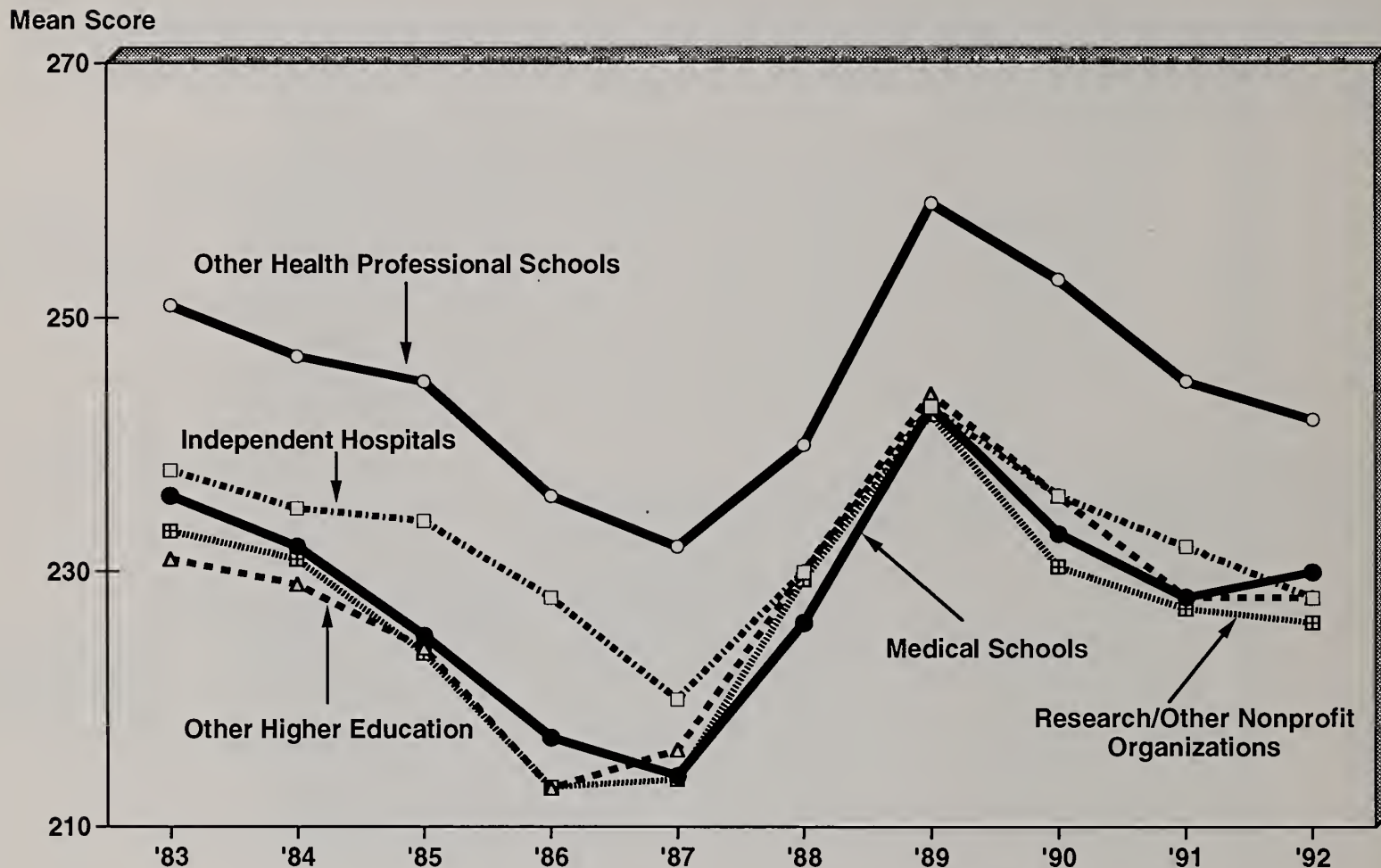
Institution Rank*	Percentage with Scores 100-175					
	New Applications			Competing continuations		
	1985	1992	Diff. 85-92	1985	1992	Diff. 85-92
1-20	31.2	25.4	-5.8	57.4	46.1	-11.3
21-40	28.6	24.7	-3.9	55.7	43.7	-12.0
41-60	27.4	20.2	-7.2	52.1	39.2	-12.9
61-100	24.4	20.2	-4.2	50.4	39.6	-10.8
over 100	23.5	15.3	-8.2	45.4	36.5	-8.9
Total	25.5	20.6	-4.9	52.2	41.2	-11.0

In 1992, the percentage of competing continuations deemed NRFC ranged from 2.9 to 5.1 percent for all ranking categories. Both new and competing continuations had substantially more not rated applications since 1985.

Institution Rank*	Percentage Disapproved/NRFC					
	New Applications			Competing continuations		
	1985	1992	Diff. 85-92	1985	1992	Diff. 85-92
1-20	6.7	9.0	2.3	1.9	3.3	1.4
21-40	7.8	10.0	2.2	1.0	3.0	2.0
41-60	8.0	12.5	4.5	1.4	3.9	2.5
61-100	9.0	13.2	4.2	1.3	2.9	1.6
over 100	14.5	20.5	6.0	2.7	5.1	2.4
Total	10.0	13.9	3.9	1.8	3.8	2.0

*Ranked by total R01 dollar support. Reviewed applications by fiscal year of IRG review.

Mean Priority Scores of DRG-Rated R01 Applications* by Kind of Institution, FY1983-1992



*Excludes withdrawals and supplements. Includes original and amended applications summarized by fiscal year of initial review.
Source: NIH, DRG, ISB, SAES

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Medical schools and schools in the "other higher education" category submitted by far the largest share of DRG-rated R01 applications -- 52 and 21 percent, respectively, in 1992. The priority scores of applications from most types of institutions have shown improvement since 1983, with the largest change (10 points) in independent hospitals. (Other health professional schools include dentistry, osteopathy, chiropractic, pharmacy, physical therapy, optometry, nursing, podiatry, university hospitals, veterinary medicine, home economics/human ecology, nutrition, and allied health professions.)

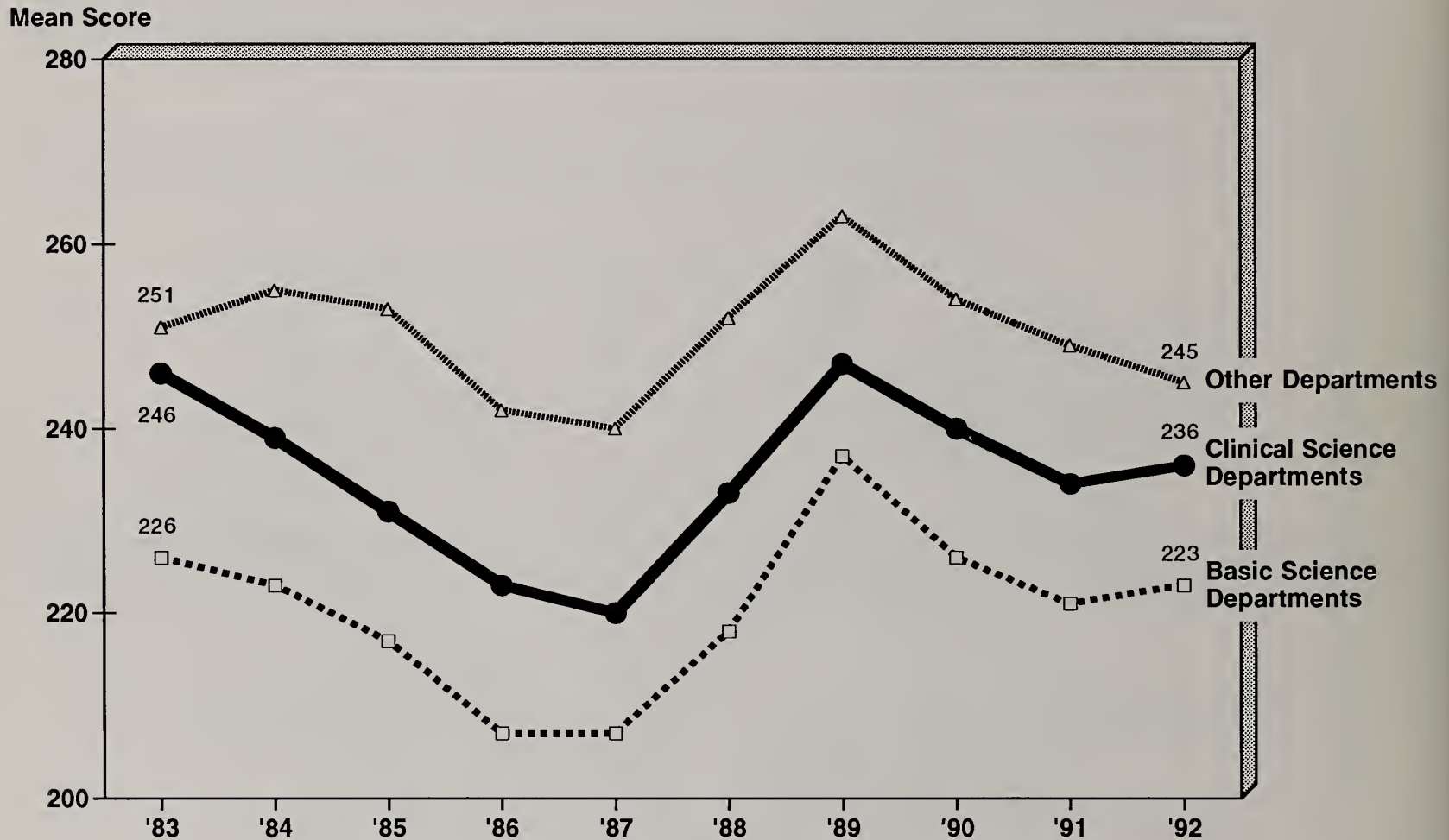
R01 applications from research/other nonprofit organizations scored better than applications submitted by other institutions in 1992. Differences between the best and the worst average scores ranged from 20 points in 1983 to 21 points in 1992. The number of R01 applications from for-profit organizations was fewer than 100 each year, and showed extremely variable score distributions and success rates.

	<u>Rated Applications</u>			<u>Rated Mean Scores</u>		
	<u>1983</u>	<u>1988</u>	<u>1992</u>	<u>1983</u>	<u>1988</u>	<u>1992</u>
Medical Schools	6,839	6,784	7,395	236	226	230
Other Health Prof.	958	1,102	1,343	251	240	242
Other Higher Education	3,117	3,145	2,932	231	230	228
Independent Hospitals	904	1,006	1,096	238	230	228
Res. & Other Nonprofit	1,228	1,084	1,291	233	229	226
Profit Organizations	25	45	58	236	251	247
Total	13,071	13,166	14,115	236	229	230

Priority ratings are among the factors that influence applications' success in obtaining funding. The following success rates are compiled from the award rate file, which deletes the initial application if an amendment is reviewed in the same fiscal year. Additionally, these data reflect fiscal year of funding or requested funding, not fiscal year of review.

	<u>1983</u>	<u>1988</u>	<u>1992</u>
Medical Schools	32.2	33.1	27.4
Other Health Prof.	27.4	28.8	22.9
Other Higher Education	33.9	31.7	27.9
Independent Hospitals	28.7	32.7	27.8
Res. & Other Nonprofit	30.6	37.1	29.0
Profit Organizations	<u>25.6</u>	<u>26.0</u>	<u>16.0</u>
Total	31.9	32.7	27.3

Mean Priority Scores of DRG-Reviewed Competing R01 Applications* from Basic versus Clinical Departments, FY1983-1992**



*Excludes withdrawals and supplements. Includes original and amended applications summarized by fiscal year of initial review.

**Institutions of higher education only.

Source: NIH, DRG, ISB, SAES

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Since 1975, about half (51 to 55 percent) of the R01 applications from institutions of higher education have come from basic science departments. (See Technical Note 16 for operational definitions of "basic" and "clinical"; "other" departments are defined as the logical complement to these.) An additional 29 to 32 percent were from clinical science departments, leaving 15 to 17 percent from all other departments. Applications from basic science departments received average scores that were about 10 to 20 points better (lower) than those from clinical departments. Clinical and "other" departments had similar scores until 1982, when a gap developed as "other" departments' scores failed to improve as much. Score levels of the three types of science departments differ, but they show parallel changes over time.

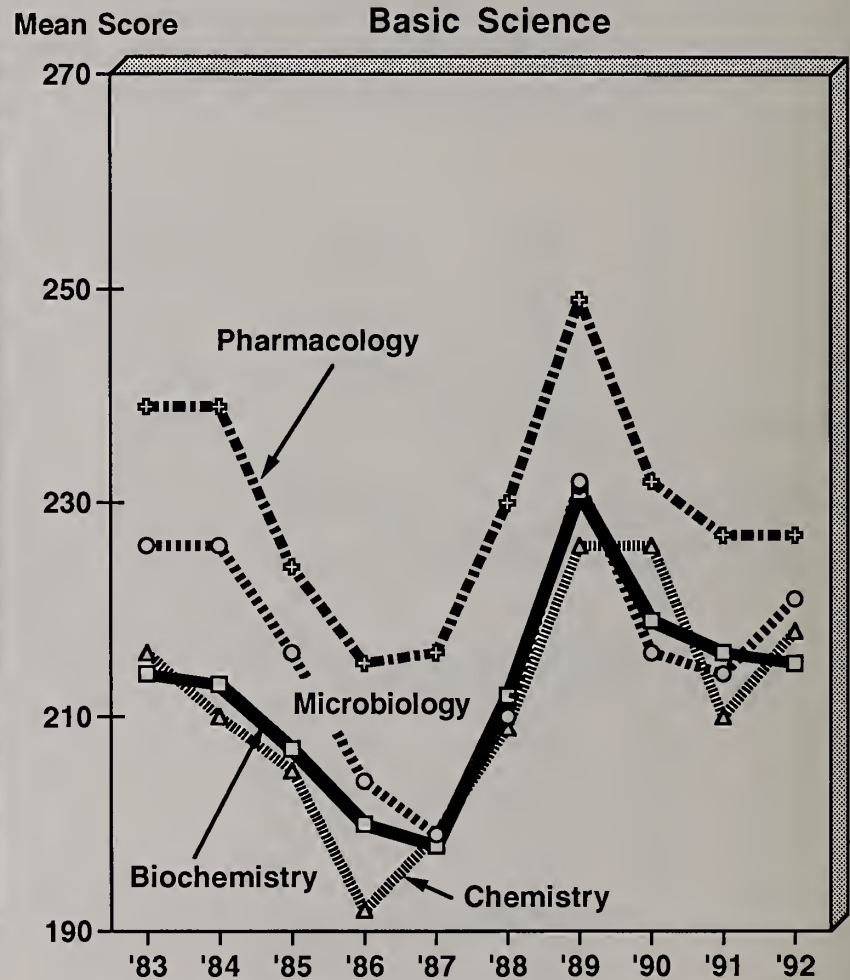
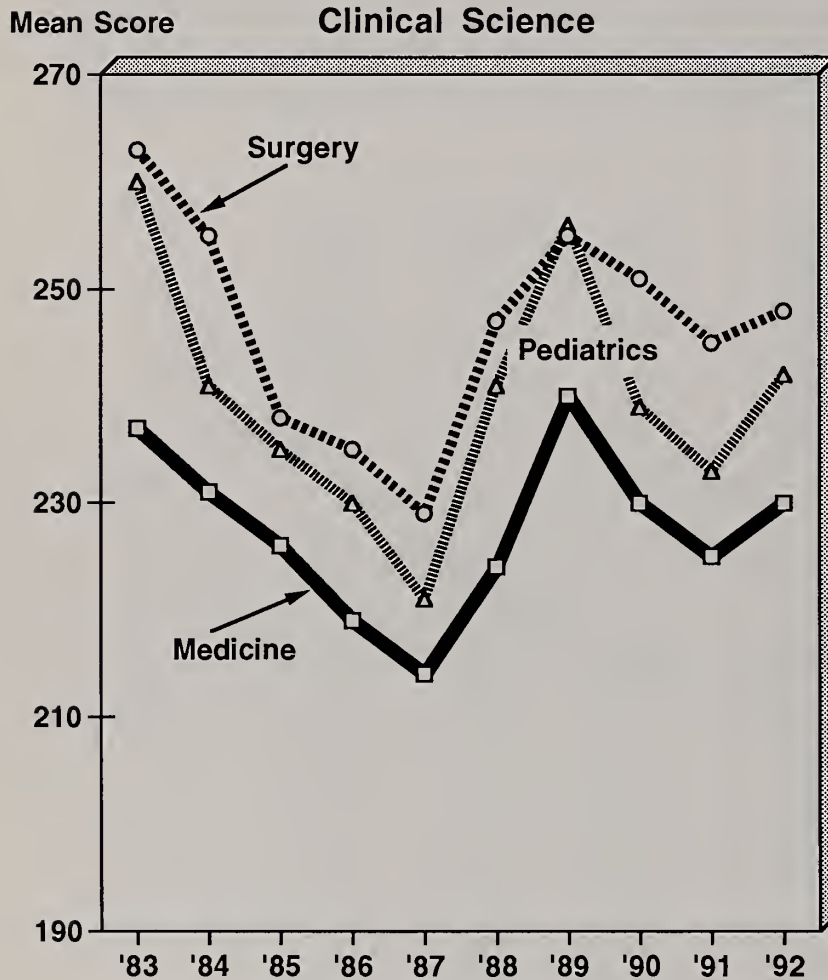
<u>Year</u>	<u>Number Reviewed*</u>			<u>Mean Scores</u>		
	<u>Basic</u>	<u>Clinical</u>	<u>Other</u>	<u>Basic</u>	<u>Clinical</u>	<u>Other</u>
1983.....	6,451	3,958	1,870	226	246	251
1985.....	7,141	4,379	1,992	217	231	253
1987.....	5,907	3,588	1,846	207	220	240
1989.....	6,581	4,093	2,169	237	247	263
1991.....	6,132	4,020	1,934	221	234	249
1992.....	6,492	4,338	1,967	223	236	245
1983-92.....	+41	+380	+97	-3	-10	-6

*From institutions of higher education; by fiscal year of IRG review.

Different types of institutions have different proportions of applications from the three types of science departments.

<u>Department Type</u>	<u>Number Reviewed</u>			<u>Mean Scores</u>		
	<u>Basic</u>	<u>Clinical</u>	<u>Other</u>	<u>Basic</u>	<u>Clinical</u>	<u>Other</u>
Medical Schools						
1990.....	3,581	3,735	186	226	239	231
1991.....	3,679	3,730	232	221	234	236
1992.....	3,900	4,012	195	223	236	231
Other Health Prof.						
1990.....	416	193	914	233	241	263
1991.....	467	229	793	232	235	256
1992.....	488	235	823	230	244	248
Other Higher Ed.						
1990.....	2,285	131	919	225	251	250
1991.....	1,986	61	909	219	218	247
1992.....	2,104	91	949	221	219	246

Mean Priority Scores of DRG-Reviewed Competing R01 Applications* by Department of Principal Investigator, FY1983-1992**



*Excludes withdrawals and supplements. Includes original and amended applications summarized by fiscal year of initial review.

**Institutions of higher education only (domestic).

Source: NIH, DRG, ISB, SAES

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Considerable score variation exists among the academic departments that are grouped in the broad categories of basic or clinical sciences. Aside from some expected overlap, however, applications from specific basic science departments average better scores than those from clinical science or "other" departments. Applications from departments of chemistry, biochemistry and genetics (basic science) averaged the best, with remarkably similar scores throughout the past decade. Departments such as medicine, neurology, dentistry, and veterinary science show mean scores that roughly overlap the high end of the basic science departments' score range. Other clinical departments, such as surgery, public health and ophthalmology have poorer average scores.

Department (Higher Ed.)	Number Reviewed*		Approved Mean Score		Department (Higher Ed.)	Number Reviewed*		Approved Mean Score	
	1983	1992	1983	1992		1983	1992	1983	1992
Clinical Science	3,676	4,048	247	237	Basic Science	6,237	6,208	226	222
Medicine	1,654	1,826	237	230	Biochemistry	1,235	1,186	214	215
Neurology	190	247	254	234	Chemistry	693	690	216	218
Radiology	222	315	247	235	Genetics	143	222	217	218
Ob.-Gynecology	200	204	237	239	Zoology	144	125	231	219
Pediatrics	433	426	260	242	Microbiology	706	793	226	221
Psychiatry	139	121	257	248	Anatomy	557	420	228	222
Surgery	425	412	263	248	Biology	796	822	230	225
Public Health	264	301	257	250	Pathology	531	600	236	227
Ophthalmology	149	196	242	252	Pharmacology	745	682	239	227
					Physiology	687	668	231	230
Other	1,395	1,410	251	246					
Dentistry	133	154	255	225					
Veterinary Science	114	164	248	228					
Miscellaneous	288	265	250	242					
Engineering (all)	198	196	250	247					
Psychology	372	284	249	250					
Nutrition	134	104	261	263					
Other Health Prof.	156	243	251	264					

*Selected departments ranked by 1992 mean score; by fiscal year of IRG review.

6. PERCENTILE RANK TRENDS

Logic for Rank Assignment

Distributional Trends

New versus Competing Continuations Trends

Percentile Ranks and Requested Years of Support

Percentile Ranks by DRG Review Sections

Percentile Ranks by Institutes and Centers

Funding Mechanisms Subject to Percentile Ranking

Code	Mechanism	Code	Mechanism
F05 [*]	International Research Fellowships	R03 [*]	Small Research Grants
F06 [*]	Senior International Fellowships	R10	Cooperative Clinical Research Grants
F07 [*]	NIH - French CNRS Program for Scientific Collaboration	R18	Research Demonstration and Dissemination Projects
F15	Scholars-in-Residence Program	R21 [*]	Exploratory/Developmental Grants
F20 [*]	Foreign Funded Fellowships	R22 [*]	U.S. - Japan Cooperative Medical Science Program
F30	Individual Predoctoral National Research Service Award (NRSA) for M.D./Ph.D. Fellowships	R24 [*]	Resource-Related Research Projects
F31	Predoctoral Individual National Research Service Award	R25	Education Projects
F32 [*]	Postdoctoral Individual National Research Service Award	R29 [*]	First Independent Research Support and Transition (FIRST) Awards
F33 [*]	National Research Service Award for Senior Fellows	R35	Outstanding Investigator Grants
F34	Minority Access to Research Careers (MARC) NRSA Faculty Fellowships	R37 [*]	Method to Extend Research in Time (MERIT) Awards (<i>see note below</i>)
F35	Intramural NRSA Individual Postdoctoral Program Appointees	S06	Minority Biomedical Research Support
F36	MARC Visiting Scientist Fellowships	S10 [*]	Biomedical Research Support Shared Instrumentation Grants
F37	Medical Informatics Fellowships	U01 [*]	Research Project (Cooperative Agreements)
F38	Applied Medical Informatics Fellowships	U10	Cooperative Clinical Research (Cooperative Agreements)
M01	General Clinical Research Centers (NCRR)	U13	Conference (Cooperative Agreements)
P01 [*]	Research Program Projects	U18	Research Demonstration (Cooperative Agreements)
P20	Exploratory Grants	U24	Resource-Related Research Project (Cooperative Agreements)
P30	Center Core Grants	U41	Biotechnology Resource (Cooperative Agreements)
P40	Animal Model/Animal and Biological Material Resource Grants	U42	Animal/Biological Materials Resource Cooperative Agreements
P41	Biotechnology Resource Grant Program	U45	Hazardous Waste Worker Health and Safety Training Cooperative Agreements
P42	Hazardous Substances Basic Research Grants Program	U54	Specialized Center (Cooperative Agreements)
P50	Specialized Center Grants	U76	Area Health Education Centers (Cooperative Agreements)
P60	Comprehensive Center Grants	U88	Services Demonstration (Cooperative Agreements)
R01 [*]	Research Projects		

^{*} Mechanism data used in Chapter calculations. N.B. F mechanisms (fellowships) are subject to percentile ranking only if reviewed by DRG. R37 and R55 grants have percentile ranks, but these scores were derived when the application was originally reviewed (generally, as an R01). If reviewed by an ICD, the percentile may not appear on the summary sheet, and is generally percentiled against the DRG base.

As the chart suggests, there are a number of funding mechanisms potentially subject to percentile ranking. Before presenting percentile data, it is appropriate to review some of the concepts and procedures involved in their calculation. The percentile (p_i) represents the relative position or rank of each priority score (along a 100.0 percentile band) among the applications reviewed by the particular initial review group (IRG) at the current meeting and the two previous meetings. If N applications of each IRG are assigned a numerical rank

(r) in ascending order of priority score, then $p_i = \left(\frac{100}{N}\right) \times \left(r - \frac{1}{2}\right)$. The percentile is the same as the cumulative percent distribution of

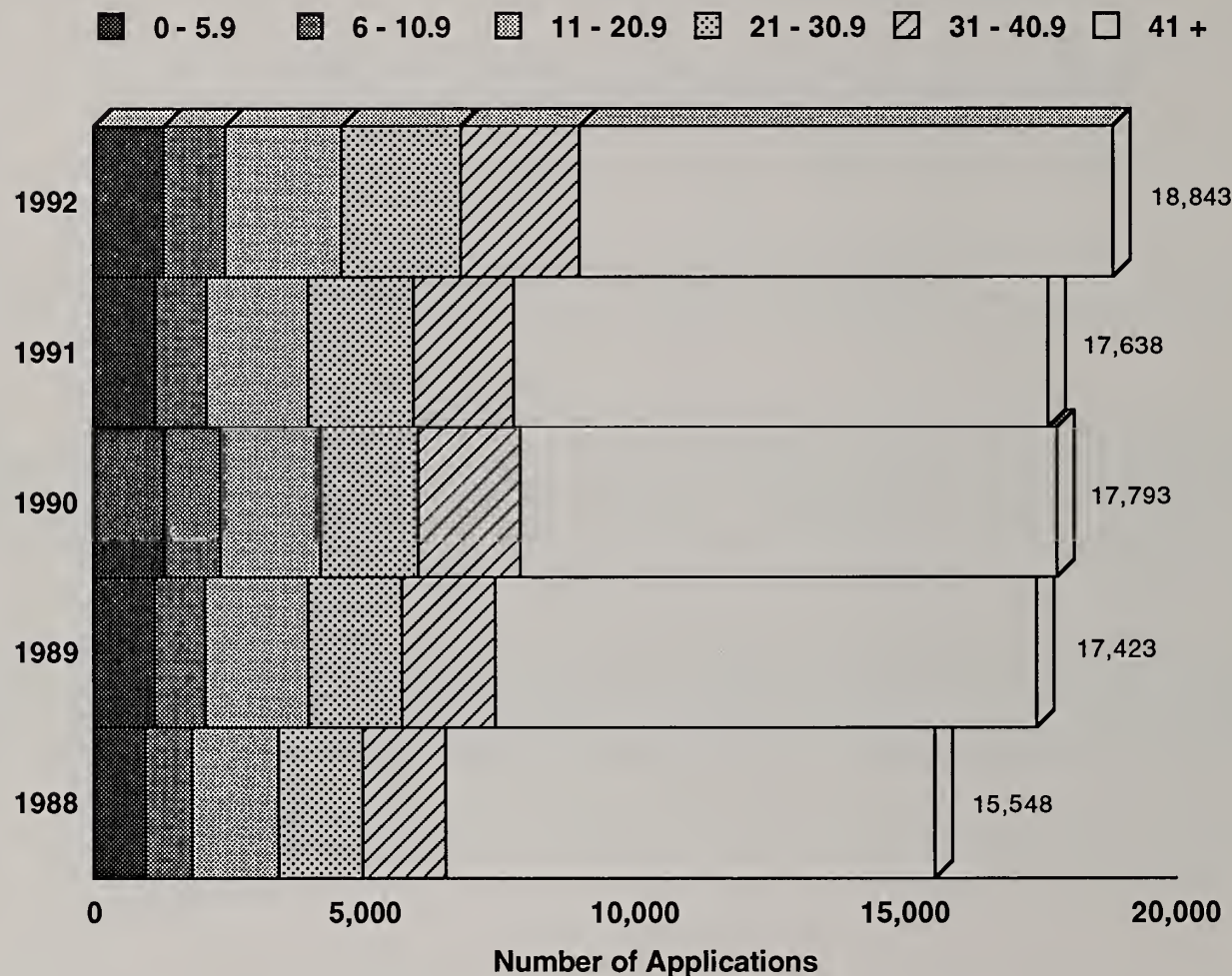
the applications reviewed by each IRG, and indicates the percent of reviewed applications with scores equal to or better than that particular application. For example, a percentile rank of 25.0 indicates that 25 percent of the applications reviewed by that IRG received equal or better (lower) scores. Tie scores are each given the same (middle) percentile rank. It is important to note that this is a reversal of the usual percentile interpretation, made in order to correspond to the priority score rating system in which lower scores indicate better applications.

To be "qualified" for the percentile computation, chartered IRGs must have met for three consecutive rounds (including the current round) in which they scored a cumulative total of at least 25 applications. Review groups not meeting these requirements are percentiled on the basis of their position among the priority scores of all qualifying IRG's which comprise the base for what is called the "Total Table." The "Total Table" to be used is determined by the ICD/agency reviewing the application. Different bases can be used for percentiling. These bases are more extensively discussed in the appendix. Since the data in this chapter is restricted to DRG chartered study sections, the following excerpt is germane.

DRG Chartered Study Sections. Competing R, P, and U applications (excluding R13, R15, R43, R44, R55, U43, and U44 activities) reviewed by chartered DRG study sections are percentiled against their own base if they have met the qualifications described above. The base includes applications reviewed in the current and prior two meetings. It also includes any applications reviewed by *ad hoc*, special emphasis panels (SEP's) or special study sections which have designated a parent study section in the prior rounds. (For a definition of *parent study section*, see the cases used for percentiling in the appendices.)

For further information concerning percentile rank assignment, the appendices provide a useful starting point.

Percentile Rank Intervals for NIH Competing Applications* Rated by DRG-Chartered Study Sections, FY1988-1992



*Original and amended applications summarized by fiscal year of initial review; excludes withdrawals and supplements.

Source: NIH, DRG, ISB, SAES

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While the focus elsewhere in this publication is generally confined to R01-related data, this chapter expands its focus to include all DRG-reviewed percentile data. It remains chiefly, however, R01 data (85.2 percent) and R29 data (9.8 percent). The remaining five percent of the data is related to the other 15 activities, as noted in the first chart of this chapter.

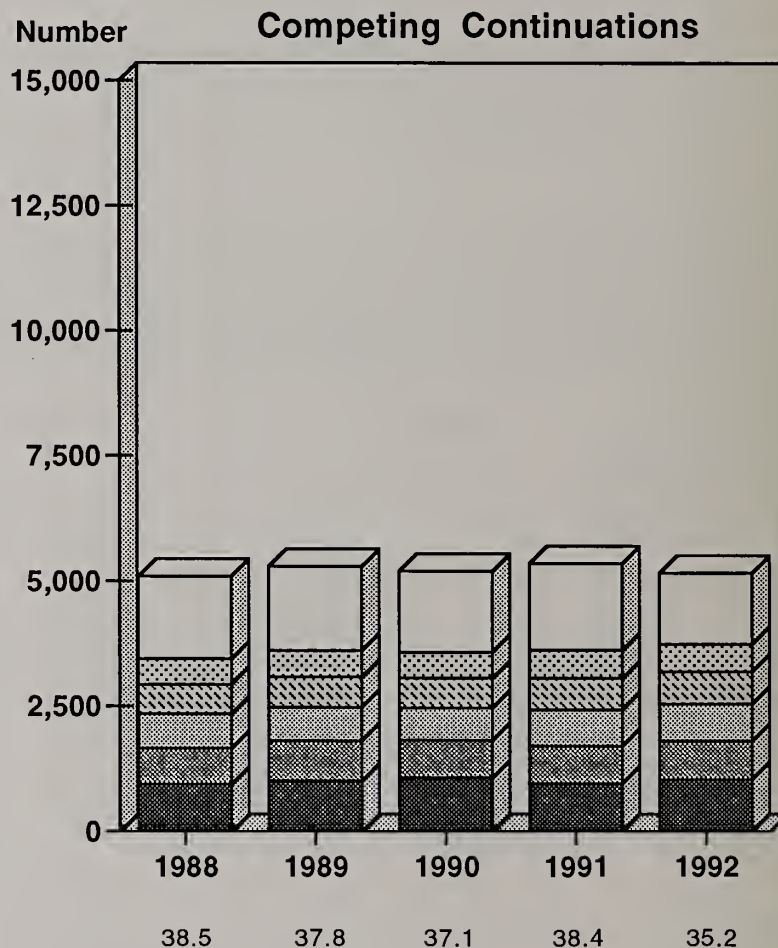
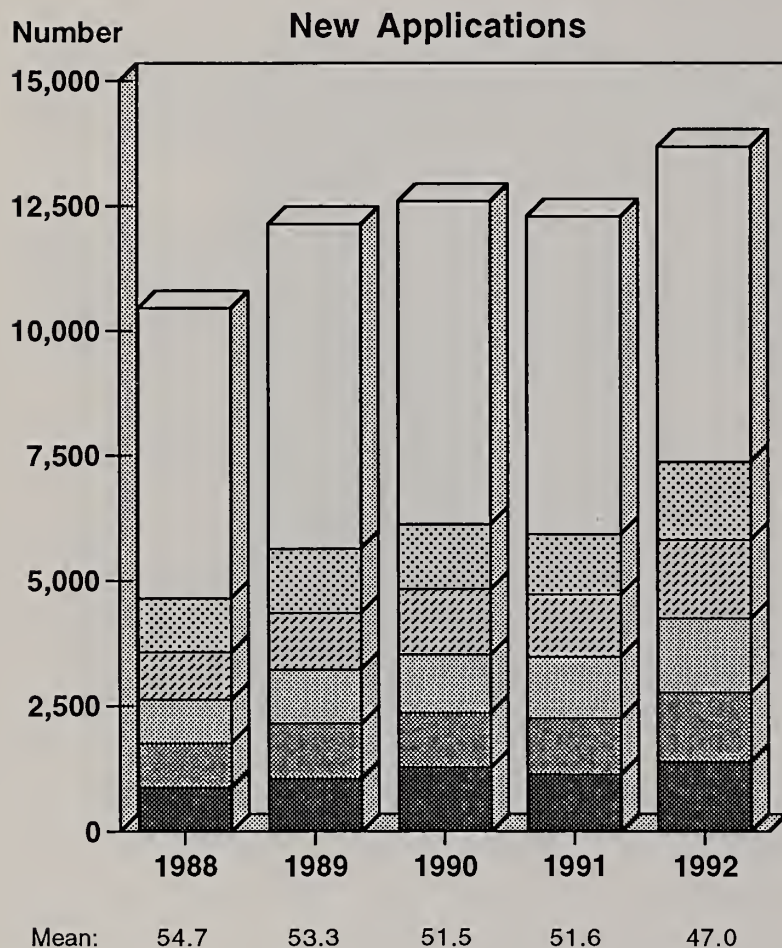
As the chart opposite suggests, percentiling R01 applications has stabilized their score distributions rather effectively. This analysis uses percentile ranks from the 80-plus DRG chartered study sections only, because percentiles are computed within and for each of these review panels. Applications reviewed by non-chartered study sections do not always use an aggregate DRG base for computing their percentile ranks, and so were omitted from this analysis. Generally, the data are grouped by deciles, or ten-point ranges. For the most part, both within deciles (across years) and across deciles (within years), there is remarkable consistency in the percentages.

Nevertheless, there is still evidence of the changes seen with priority scores. That is, more applications received better percentile ranks in 1992 than in 1988. It is not clear whether this is simply the result of more ties, or changes in the density of the priority score distributions. One might expect, naively, to have seen about 2,100 applications in 1992 in the first decile. Instead, there were over 2,400. The first decile grew by 0.4 percent over the first 5 years of percentile ranks, while the proportion of scores in the worst half of the distribution declined. One conclusion from these data is that it is inappropriate to equate percentile ranks with percentage of all scores.

		<u>1988</u>		<u>1989</u>		<u>1990</u>		<u>1991</u>		<u>1992</u>		<u>1988-92</u>	
Percentile Rank	Intervals	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
	0 - 5	962	5.9	1,134	6.3	1,325	7.3	1,157	6.4	1,307	6.2	+345	+0.3
	6 - 10	861	5.3	934	5.2	1,026	5.7	940	5.2	1,131	5.4	+270	+0.1
	11 - 20	1,590	9.8	1,893	10.5	1,836	10.1	1,864	10.3	2,141	10.2	+551	+0.4
	21 - 30	1,557	9.6	1,736	9.6	1,814	10.0	1,950	10.8	2,215	10.6	+658	+1.0
	31 - 40	1,537	9.5	1,737	9.6	1,897	10.5	1,870	10.3	2,204	10.5	+667	+1.0
	41 - 50	1,577	9.7	1,811	10.0	1,809	10.0	1,769	9.8	2,112	10.1	+535	+0.4
	51 - 100	7,464	46.0	8,178	45.3	8,086	44.5	8,088	44.7	7,733	36.8	+269	-9.2
Disapproval/ NRFC		604	3.7	429	2.4	353	1.9	419	2.3	2,105	10.0	1,501	+6.3
	<i>N</i>	16,152		17,852		18,146		18,057		20,948		+4,796	

NIH Competing Applications* Rated by DRG-Chartered Study Sections by Type and Percentile Rank Intervals, FY1988-1992

■ 0 - 10.9 ▨ 11 - 20.9 ▩ 21 - 30.9 ▤ 31 - 40.9 ▥ 41 - 50.9 □ 51 +



*Includes original and amended applications summarized by fiscal year of initial review. Excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

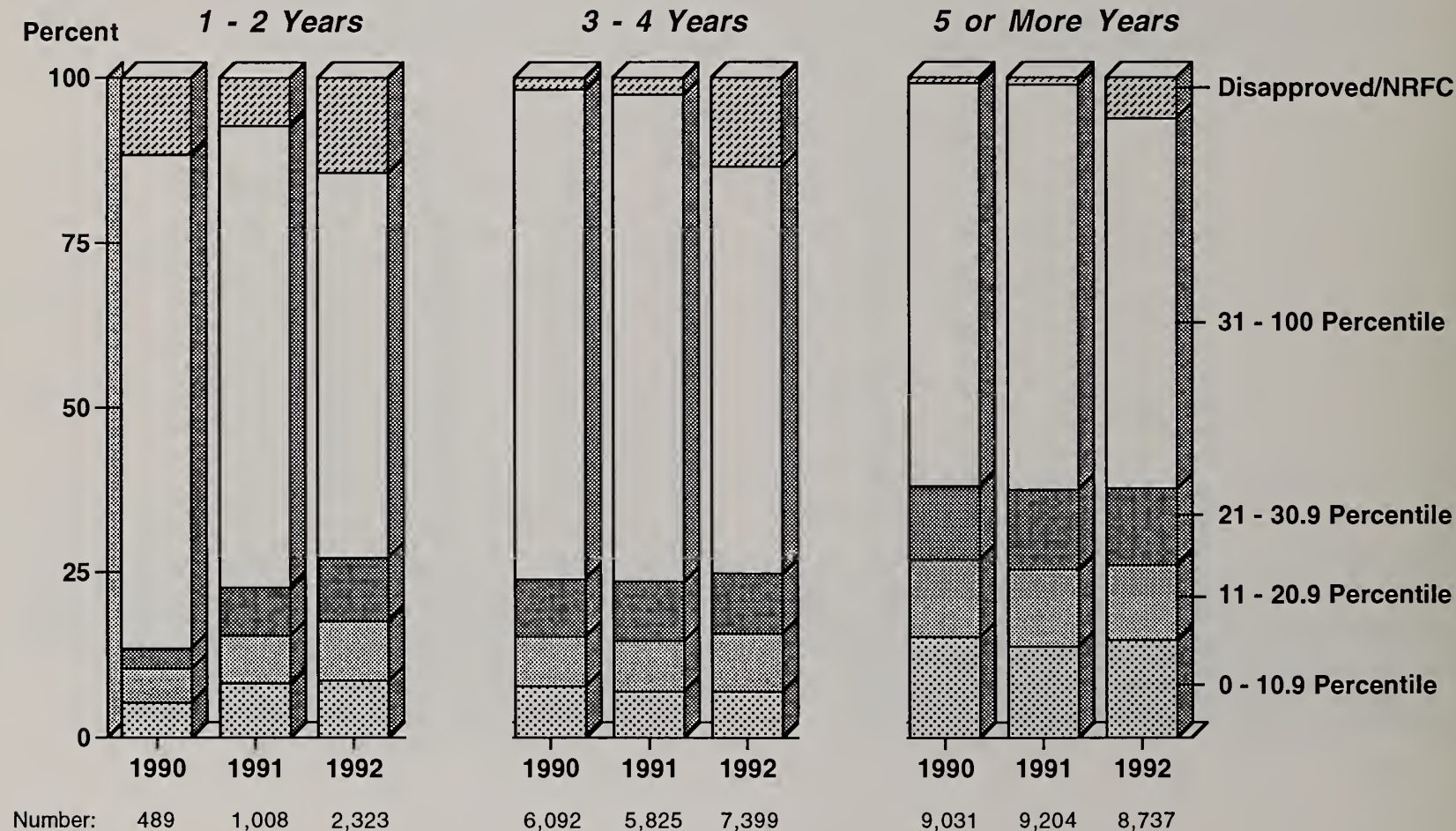
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These data continue to demonstrate the advantage that competing continuation applications enjoy with percentile ranks. Most striking about these distributions are the by far larger proportions of the new applications which fall in the bottom half of the rankings (see the category "51 and Above".) The relative values of the means also corroborate this conclusion. Given that competing continuation applications have previously demonstrated their scientific worth (and received funding), this is not altogether surprising.

		Percentile Rank Interval							
		0.0 - 10.9	11.0 - 20.9	21.0 - 30.9	31.0 - 40.9	41.0 - 50.9	51 and Above	Rated	
		<u>N</u>	<u>N</u>	<u>N</u>	<u>N</u>	<u>N</u>	<u>N</u>	Mean	Median
New	1988	874	876	874	952	1,066	5,819	54.7	56.7
	1989	1,055	1,090	1,080	1,130	1,281	6,502	53.3	54.5
	1990	1,270	1,090	1,170	1,303	1,297	6,466	51.5	52.3
	1991	1,139	1,112	1,229	1,245	1,208	6,357	51.6	52.7
	1992	1,396	1,372	1,479	1,563	1,565	6,308	47.0	47.7
Competing Continuation	1988	949	714	683	585	511	1,645	38.5	34.0
	1989	1,013	803	656	607	530	1,676	37.8	33.6
	1990	1,081	746	644	594	512	1,620	37.1	33.1
	1991	958	752	721	625	561	1,731	38.4	34.3
	1992	1,042	769	736	641	547	1,425	35.2	31.4

Finally, the relationships between the rated means and medians suggest an opposite skewness to the new and competing continuation applications. Where means and medians differ, generally speaking, the mean tends to the more extreme tail while the median more closely follows the bulk of the distribution. These data suggest that the bulk of the new applications are in the higher ranks (their annual means are consistently above their annual medians). Conversely, the opposite trend is seen in the competing continuation data (suggesting that a preponderance of these data are in the lower ranks).

NIH Competing Applications* Rated by DRG-Chartered Study Sections by Requested Years of Support and Percentile Rank Intervals, FY1990-1992



*Includes original and amended applications summarized by fiscal year of initial review. Excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

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As seen previously with priority scores, applications with different requested years of support have dramatically different percentile rank distributions. Requests for 5 or more years of support have much better percentile ranks than do requests for 3 or 4 years, and even more so than requests for only 1 or 2 years.

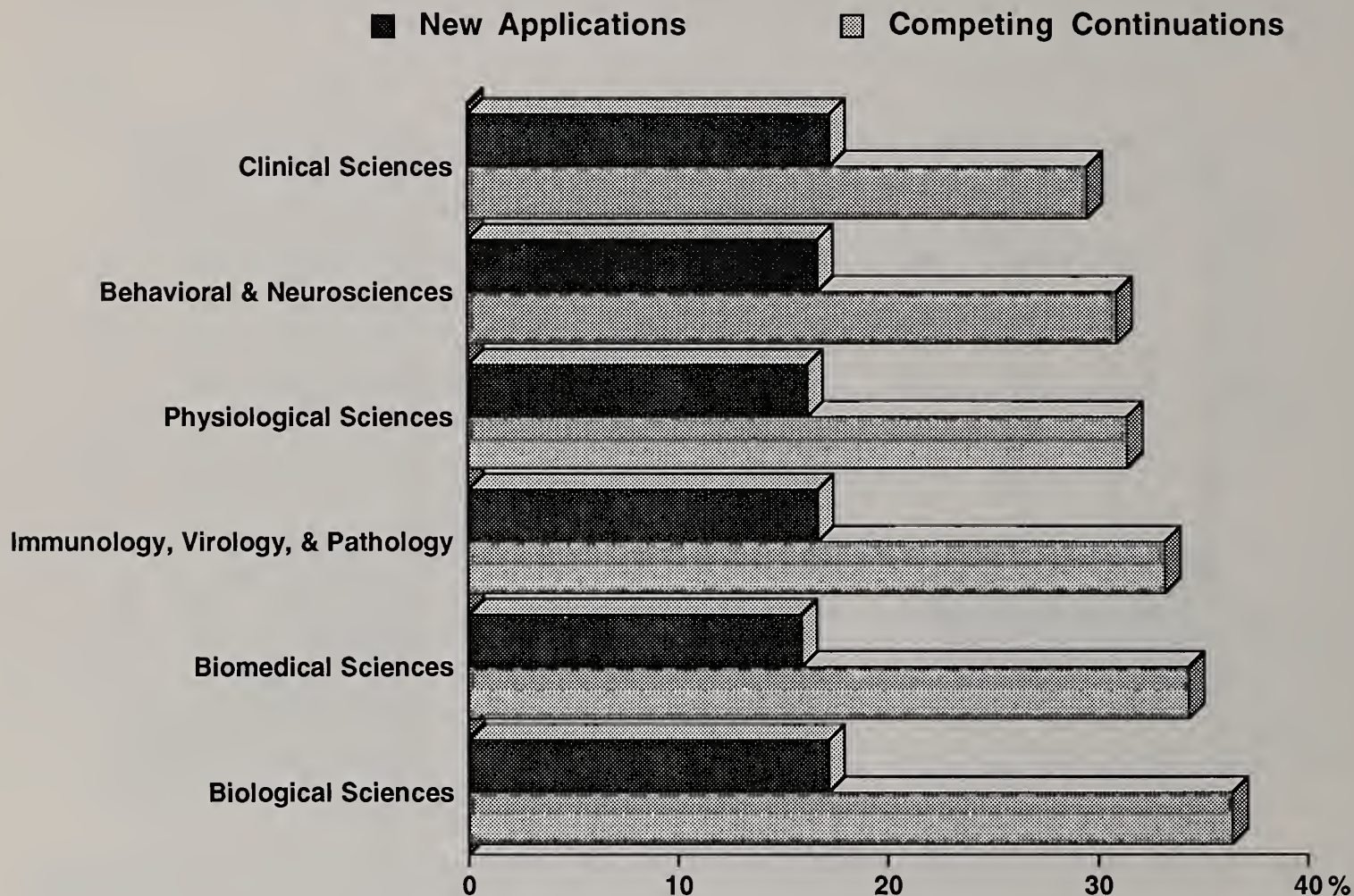
Percentile Rank Interval	Number of Applications								
	Length of Requested Support *								
	1 - 2 Years			3 - 4 Years			5 or More Years		
	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
0 - 10.9	26	82	199	475	410	521	1,386	1,271	1,291
11 - 20.9	25	73	208	455	445	643	1,052	1,079	984
21 - 30.9	15	74	223	524	516	678	1,015	1,108	1,019
31 - 100	366	705	1,356	4,528	4,300	4,556	5,503	5,648	4,904
Disapproved/ NRFC	55	73	337	110	153	1,001	75	98	539
Total	487	1,008	2,323	6,092	5,824	7,399	9,031	9,204	8,737

Percentile Rank Interval	Percentages								
	1 - 2 Years			3 - 4 Years			5 or More Years		
	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
0 - 10.9	5.3	8.1	8.6	7.8	7.0	7.0	15.3	13.8	14.8
11 - 20.9	5.1	7.2	9.0	7.5	7.6	8.7	11.6	11.7	11.3
21 - 30.9	3.1	7.3	9.6	8.6	8.9	9.2	11.2	12.0	11.7
31 - 100	74.8	69.9	58.4	74.3	73.8	61.6	60.9	61.4	56.1
Disapproved/ NRFC	11.7	7.3	14.5	1.8	2.6	13.5	0.8	1.1	6.2

*Based on reviewed applications by fiscal year of chartered DRG study section review.

Since 1990, all three segments have shown relatively constant distributional densities. These proportions suggest that competing applications requesting only 1 or 2 years of support face much less likely prospects for funding. In 1992, for instance, less than 18 percent of this group were in the "best" percentile rank band (less than 21). At the same time, over 26 percent of the longest projects (five or more years) scored in the region most likely to receive support.

Percent of Competing Applications* in Percentile Ranks 0-20.9 by DRG Review Sections, FY1992



*Includes original and amended applications summarized by fiscal year of initial review. Excludes withdrawals and supplements.
Source: NIH, DRG, ISB, SAES

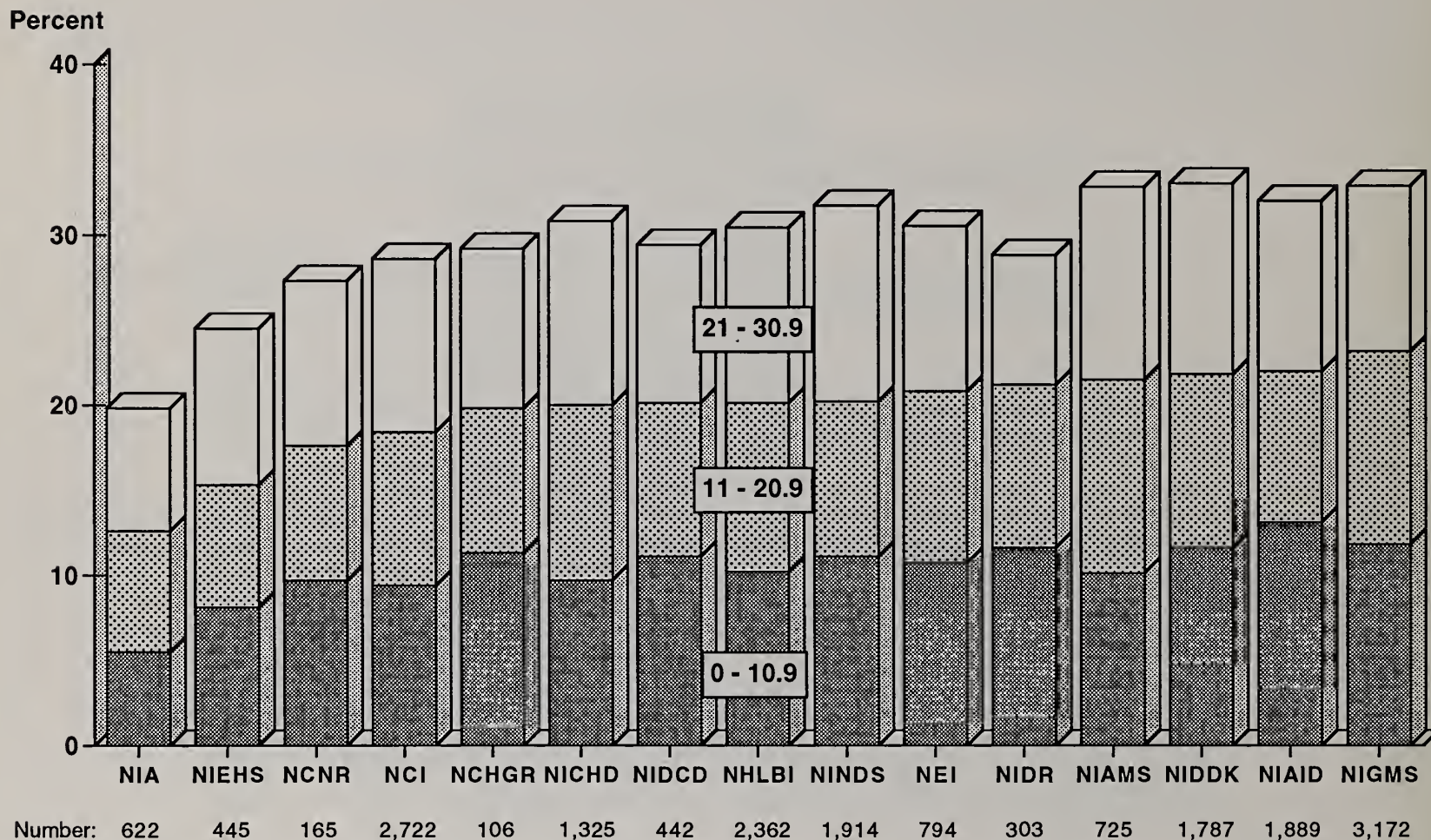
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The data suggest a remarkable consistency among review sections in their treatment of new applications, and a rough sense of equivalence in their treatment of competing continuations. The percentage of new applications in the best region ranged from 13.6 to 18.0 across sections and years. At the same time, the percentage of competing continuations in the best region ranged from 27.8 to 36.6. These results demonstrate (a) the relative comparability of the review sections, and (b) the formidable challenge that new applications continue to have in the competition for funding.

Percent of New and Competing Continuation Applications in the Percentile Ranks 0.0 - 20.9

	Fiscal Year of Initial Review	Behavioral/ Neurosciences	Biological Sciences	Biomedical Sciences	Clinical Sciences	Physiological Sciences	Immunology, Virology, and Pathology
New	1988	13.8	16.9	13.6	16.0	14.8	16.3
	1989	15.5	17.8	16.1	16.6	16.9	17.2
	1990	17.7	16.0	17.0	17.3	16.1	17.5
	1991	15.7	17.9	15.0	16.7	17.3	18.0
	1992	16.7	17.2	15.9	17.3	16.2	16.7
Competing Continuation	1988	30.7	32.1	33.9	29.7	31.0	31.8
	1989	28.8	36.3	33.1	33.6	29.2	35.7
	1990	30.9	36.6	34.6	32.7	33.8	31.9
	1991	31.4	31.5	30.7	31.0	27.8	30.3
	1992	30.9	36.4	34.3	29.5	31.4	33.2
Total	1988	18.9	21.7	21.3	20.0	19.7	21.7
	1989	19.3	23.6	22.0	21.2	20.6	23.1
	1990	21.5	22.1	23.1	21.5	21.4	21.6
	1991	20.6	21.9	20.7	20.7	20.8	21.2
	1992	20.8	21.3	21.7	20.4	20.4	20.8

DRG Study Section Action on Competing Applications' Percentile Ranks* by Assigned Institute / Center, FY1992



*Ranked by percent of applications scored 0 to 20.9. Excludes withdrawals and supplements.
Includes original and amended applications summarized by fiscal year of initial review.
Source: NIH, DRG, ISB, SAES

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Given the priority score distributions previously presented, it is not particularly surprising that percentile ranks of DRG-reviewed applications also differ by assigned ICD. Large differences are still observed.

	Percent Within Rank Intervals, FY 1992						Mean Percentile	Median Percentile	N
	0.0 to <u>10.9</u>	11.0 to <u>20.9</u>	21.0 to <u>30.9</u>	31.0 to <u>100.0</u>	0.0 to <u>20.9</u>	0.0 to <u>30.9</u>			
ICD									
NIA	5.5	7.1	7.2	63.7	12.6	19.8	51.1	53.3	622
NIEHS	8.1	7.2	9.2	58.7	15.3	24.5	48.3	48.1	445
NCNR	9.7	7.9	9.7	54.5	17.6	27.3	44.7	45.4	165
NCI	9.4	9.0	10.2	57.8	18.4	28.6	45.0	44.4	2,722
NCHGR	11.3	8.5	9.4	38.7	19.8	29.2	36.2	35.8	106
NICHD	9.7	10.3	10.8	55.7	20.0	30.8	43.9	43.2	1,325
NIDCD	11.1	9.0	9.3	55.2	20.1	29.4	42.9	41.2	442
NHLBI	10.2	9.9	10.3	57.5	20.1	30.4	44.5	44.2	2,362
NINDS	11.1	9.1	11.5	57.6	20.2	31.7	45.3	44.8	1,914
NEI	10.7	10.1	9.7	58.3	20.8	30.5	44.1	43.8	794
NIDR	11.6	9.6	7.6	60.1	21.2	28.8	45.4	45.5	303
NIAMS	10.1	11.4	11.3	56.4	21.5	32.8	44.0	42.8	725
NIDDK	11.6	10.2	11.2	56.4	21.8	33.0	44.0	42.4	1,787
NIAID	13.1	8.9	10.0	57.2	22.0	32.0	43.4	42.5	1,889
NIGMS	11.8	11.4	9.7	57.8	23.2	32.9	43.9	43.0	3,172

At least in the extremes, it is also interesting to note that the order of ICDs arrayed by R01 priority score distributions in the 100 to 175 range (p. 55) corresponds roughly to the order of ICDs arrayed here by percentile ranks (0.0 to 20.9). One of the most striking transpositions is that of the NEI-assigned applications; there were 19.9 percent approved NEI R01 applications with scores between 100 and 175, which placed it next to last.

APPENDICES

- Glossary of Terms
 - Bases Used for Percentiling
 - Minority-Targeted Grant Activities
 - Definitions of Selected Grant Activities
 - Other Publications of Interest
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Glossary of Terms

Activity Code (coverage) A code assigned by the NIH to identify special groupings of support mechanisms. General categories include research grants, contracts, training programs, and fellowships. Research grants, in turn, can be subdivided into research projects, research centers, and other research grants. (For definitions of individual codes, see *Activity Codes, Organization Codes and Definitions Used in Extramural Programs*, January 1994, NIH Manual Issuance 4101/6304-2.)

ADAMHA Alcohol, Drug Abuse, and Mental Health Administration. Effective October 1992, the service components of ADAMHA were assigned to the Substance Abuse and Mental Health Services Administration (SAMHSA). The three research components of ADAMHA became part of the NIH. This added the National Institute on Alcohol Abuse and Alcoholism (NIAAA), the National Institute on Drug Abuse (NIDA), and the National Institute of Mental Health (NIMH) to the NIH.

Amendment (amended or revised applications) Resubmission of an unfunded application that has been revised in response to a prior review.

Application A formal request for support of a specific project or comparable activity.

Application Type Identifies form of application. (See **New**, **Competing Continuation**, **Noncompeting Continuation**, and **Supplement**.)

Award Signifies that funds have been obligated, includes both direct and indirect costs unless indicated. (See **Grant**.)

BRDPI Biomedical Research & Development Price Index. The BRDPI is developed for the NIH to measure changes in the prices of items and services required for its Research and Development (R&D) activities. (See **Constant Dollars**, **Current Dollars**.)

Competing Continuation An application which requires competitive peer review and institute/center action to continue beyond the current competitive segment. Also known as a Renewal.

Constant Dollars Dollar amounts based on buying power in a certain base year. The Biomedical Research and Development Price Index is used to find the constant dollar amounts from current dollar figures. (See **BRDPI**.)

Contract A funding mechanism in which the NIH procures specified services.

Council Each Institute/Center that awards grants has a statutorily mandated National Advisory Council or Board that provides the second level of review for grant applications. The Councils/Boards are comprised of both scientific and lay representatives. Council/Board recommendations are based not only on the consideration of scientific merit (as judged by the initial review groups), but also on the relevance of the proposed study to the Institute's programs and priorities. With few exceptions, grants cannot be awarded without recommendations for approval by a Council/Board. Councils/Boards make recommendations to Institute staff on funding. They also advise on the overall program of the particular Institute they serve. (See **IRG**.)

CPI Consumer Price Index. Measures changes in prices of a broad range of consumer items. (See **BRDPI**.)

Current Dollars Actual dollars awarded, without adjustment for inflation. (See **Constant Dollars**.)

DFM Division of Financial Management.

DHHS Department of Health and Human Services. A federal executive department of which the Public Health Service is a component.

Direct Cost Award component consisting of itemized equipment, personnel, travel, and other expenses necessary to carry out the research proposal. (Compare with **Indirect Cost**, **Total Cost**.)

DRG Division of Research Grants, NIH.

Extramural Awards Funds provided by the National Institutes of Health to organizations outside the NIH. (See **Intramural**.)

Fellowship An NIH training program award in which an *individual* applies to, and (where appropriate) receives an award directly from the NIH. Fellowships comprise the F activity codes. (See **Training**.)

FIRST Award (R29) First Independent Research Support and Transition Award. Intended to provide a sufficient initial period of research support for newly independent biomedical investigators to develop their research capabilities and demonstrate the merit of their research ideas.

Fiscal Year (FY) The period established for government accounting purposes. Fiscal year 1993, for example, started October 1, 1992 and ended September 30, 1993.

Fiscal Year of IRG Review The fiscal year in which the initial review groups (IRG's) meet.

Funded Carryover A competing application which is unfunded at the end of a fiscal year, but subsequently (in the fiscal year under consideration) is funded.

Glossary of Terms

Grant (award) Funding for a particular scientific inquiry from one of the NIH's institutes or centers.

HBCU Historically Black College or University. A college or university established prior to 1964 whose principal mission was the education of African Americans. Many HBCU's are located in the South. (See **Minority Institution, Traditionally or Predominantly African American Institution**.)

IMPAC (Information for Management, Planning, Analysis, and Coordination) This database is the primary source of information for this publication. IMPAC is a computer-based system developed and maintained by the NIH Division of Research Grants for information concerning Public Health Service extramural programs. (For definitions of each item in IMPAC, see *IMPAC Definitions & Specifications, Master File*, July 1993.)

Indirect Cost Award component provided to help defray costs of institutional overhead and grant administration. The amount of indirect cost awarded is usually derived from the "indirect cost rate," a prearranged, negotiated percentage of the direct cost award. Separate rates are negotiated with each institution. Several research grant mechanisms are not eligible for full indirect cost reimbursement: foreign research grants; conferences (R13); education grants (R25); biomedical research support grants (S07, S10); small instrumentation grants (S15); research development grants (S08); research career program awards (K's); minority student apprentice program (S03); and hazardous waste worker health and safety training programs (D42). (Compare with **Direct Cost, Total Cost**.)

Institutes/Centers NIH Institutes, Centers, or Divisions; components of the National Institutes of Health (includes the National Library of Medicine). Institutes/Centers can make extramural awards. Institutes/Centers include:

AA	National Institute on Alcohol Abuse and Alcoholism (NIAAA)	ES	National Institute of Environmental Health Sciences (NIEHS)
AG	National Institute on Aging (NIA)	EY	National Eye Institute (NEI)
AI	National Institute of Allergy and Infectious Diseases (NIAID)	GM	National Institute of General Medical Sciences (NIGMS)
AR	National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)	HD	National Institute of Child Health and Human Development (NICHD)
CA	National Cancer Institute (NCI)	HG	National Center for Human Genome Research (NCHGR)
CL	Clinical Center (CLC)	HL	National Heart, Lung and Blood Institute (NHLBI)
CT	Division of Computer Research and Technology (DCRT)	LM	National Library of Medicine (NLM)
DA	National Institute on Drug Abuse (NIDA)	MH	National Institute of Mental Health (NIMH)
DC	National Institute on Deafness and Other Communication Disorders (NIDCD)	NR	National Institute for Nursing Research (NINR)
DE	National Institute of Dental Research (NIDR)	NS	National Institute of Neurological Disorders and Stroke (NINDS)
DK	National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	RG	Division of Research Grants (DRG)
DS	Division of Safety (DS)	RR	National Center for Research Resources (NCRR)
		TW	Fogarty International Center (FIC)

Intramural Research conducted by, or in support of, employees of the NIH.

IRG Initial Review Group. The first level of a two-stage peer review system. These legislatively mandated panels of experts are established generally according to scientific disciplines or organ or disease areas. Their primary function is the review and rating of research grant applications for scientific and technical merit. They make recommendations for appropriate level of support and duration of award. (See **Council**, **Priority Score**.)

ISB Information Systems Branch, Division of Research Grants, NIH.

MARC Minority Access to Research Careers. Program to provide special research training opportunities in the biomedical sciences for students and faculty at 4-year colleges and health professional schools in which substantial student enrollments are drawn from minority groups.

MBRS Minority Biomedical Research Support. Program to strengthen the biomedical research and research training capability of ethnic minority institutions, and thus establish a more favorable milieu for increasing the involvement of minority faculty and students in biomedical research.

Mechanism Also known as **Activity Code**.

MERIT Award (R37) Method to Extend Research In Time Award. Designed to provide long-term support to investigators whose research competence and productivity are distinctly superior and who are highly likely to continue to perform in an outstanding manner. Investigators may not apply for a MERIT award. Candidates are identified for the MERIT award during the course of review of competing research grant applications prepared and submitted in accordance with regular PHS requirements.

Minority Institution Institutions which draw a substantial share of its enrollments from minorities. They include institutions with a traditionally high (more than 50 percent) minority enrollment, and those with a significant proportion of students derived from ethnic minorities (but not necessarily more than 50 percent) and recognized by the Secretary of DHHS as having demonstrated a commitment to the special encouragement or assistance of minority students and faculty. (See **HBCU**, **Traditionally or Predominantly African American Institution**.)

Minority Targeted Grant Program An NIH program available to members of minority groups and to minority institutions. The aim is to benefit minorities, even if individual grants go to nonminorities.

New (application, award, grant) Refers to an application which has not received prior funding. (Compare with **Competing Continuation**, **Noncompeting Continuation**, **Supplement**.)

Glossary of Terms

NIH National Institutes of Health

NIH/OD National Institutes of Health, Office of the Director

Noncompeting Continuation A year of continued support for an existing grant that had been funded previously. Applications for this continued support do not undergo peer review, but are administratively reviewed by the Institute/Center and receive an award based on prior award commitments. (See **New, Competing Continuation, Supplement**.)

NRFC Not Recommended for Further Consideration. Starting in FY 1992, as a result of study section review, an application may be considered not recommended for further consideration if it does not have "significant and substantial merit." This is a broader category than "disapproval," a term which is no longer used.

NRSA National Research Service Award. Includes awards to both individuals and institutions to provide research training in specified health related areas.

Other Research Grants All research grants not coded as research projects or research centers. (See **Research Projects, Research Centers**.)

Percentile Rank Percentile rank of a particular application is the percent of these applications with equal or better scores than the particular application. An application is usually percentiled against the applications reviewed within its own study section in three consecutive meetings. (See **Percentiling, Priority Score**.)

Percentiling The statistical mechanism that, since the October 1988 Advisory Council round, has been the major determinant of the funding decisions of all institutes. Each study section's applications that are recommended for further consideration are ranked in percentiles according to priority score. As with priority scores, the lower the numerical value, the greater the merit of the application. A basic assumption of percentiling is that the quality of reviewed applications is roughly equivalent among all study sections. (See **Percentile Rank, Priority Score**.)

PHS U.S. Public Health Service, which is part of the Department of Health and Human Services. NIH is the largest agency within the PHS.

Principal Investigator The individual who is responsible for the scientific and technical direction of a project and in whose name the grant application is submitted.

Glossary of Terms

Priority Score A priority score is assigned to an application that is recommended for further consideration by an initial review group (IRG). The score is a quantitative indicator of scientific and technical merit that ranges from 100 to 500. Individual IRG members assign scores from 1.0 (highest merit) to 5.0 (lowest merit). Under laws governing NIH's chartered advisory committees, only regular members or members of the NIH Reviewers Reserve (not *ad hoc* consultants) are permitted to vote on application quality. Votes were cast in 0.5 intervals until 1980. Since then, in order to achieve more precise scoring, votes have been cast in 0.1 intervals. The three-digit priority scores are the average of member votes multiplied by 100. (See IRG.)

Race/Ethnic Origin The category that most closely reflects the individual's recognition in the community should be used for purposes of reporting mixed racial and/or ethnic origins.

Native American is a person having origins in any of the original peoples of North America, and who maintains a cultural identification through tribal affiliation or community. (PHS Form 398 identifies these as American Indian or Alaskan Native.)

Asian or Pacific Islander is a person having origins in any of the peoples of the Far East, Southeast Asia, and the Indian subcontinent or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa.

African American is a person having origins in any of the black racial groups of Africa. (PHS Form 398 identifies as Black.)

Hispanic is a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

White, not of Hispanic origin is a person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

The term "**Underrepresented Minorities**" is used to describe those who are in smaller number in the biomedical sciences than would be their proportion in the general population. These include African Americans, Hispanics, and Native Americans.

Glossary of Terms

Renewal See **Competing Continuation**.

Research Centers Research center grants support multidisciplinary, long-term research and development programs at research centers. Research centers usually have a clinical orientation and include all **P** activities (excluding NLM for all years and NCNR for FY 1986) that are not included in research projects; all **M** activities; selected **U** activities (**U40**, **U41**, **U42**, **U54**); **R07** and **G12**.

Research Grants Extramural awards made for **Research Projects**, **Research Centers**, and **Other Research Grants**.

Research Projects (RPG) Primarily investigator-initiated, basic scientific research. Activity codes for research projects in FY 1993 are as follows: **R01**, **R29**, **R35**, **R37**, **R43**, **R44**, **R55**, **P01**, **P42**, **U01**, **U19**, **U43**. Excludes NCRR for fiscal years prior to FY 1990, NLM for all years, NCNR for FY 1986, and **U01** for FY's 1980 and 1981. For definitions of these codes, see *Activity Codes, Organization Codes, and Definitions Used in Extramural Programs*, January 1994, NIH Manual Issuance 4101/6304-2.

Review The dual-level examination of an application for scientific merit and program relevance. (See **IRG**, **Council**.)

RPG Research Project Grant. (See **Research Projects**.)

SAES Statistics, Analysis and Evaluation Section, Information Systems Branch, Division of Research Grants, NIH.

SBIR Award (R43, R44, U43, U44, N43, N44) Small Business Innovation Research Award. Designed to support projects that may ultimately have commercial viability.

Study Section An Initial Review Group (IRG) that is within the Division of Research Grants (DRG).

Success Rate The percentage of reviewed applications that receive funding. It is computed by dividing the number of competing applications funded by the sum of: (1) total number of competing applications reviewed, (2) number of funded carryovers, (3) number of applications eliminated during triage. Applications that have one or more amendments in the same fiscal year are counted only once in success rate computation. (See **Funded Carryover**, **Triage**.)

Supplement A request for additional funds either for the current operating year or for any future year previously recommended. A supplement can be either noncompeting (administrative) or competing (subject to peer review).

Total Cost The sum of the **Direct Cost** plus the **Indirect Cost**.

Traditional Research Project Grant (R01) Intended to support a discrete, specified, circumscribed project to be performed by the named investigator(s) in an area representing their specific interest and competencies.

Glossary of Terms

Traditionally or Predominantly African American Institution An institution with a significant African American population. These institutions are eligible for MARC and MBRS programs. (See HBCU.)

Training Training awards support the research training of scientists for careers in the behavioral and biomedical sciences. Training awards consist of institutional training grants (T mechanisms) and individual fellowships (F mechanisms).

Triage The process of eliminating from review those applications submitted in answer to a request for application (RFA) which were judged to be of noncompetitive quality.

Bases Used for Percentiling

DRG Chartered Study Sections.

Competing R, P, and U applications (excluding R13, R15, R43, R44, R55, U43, and U44 activities) reviewed by chartered DRG Study Sections are percentiled against their own base if they have met the qualifications described on page 103. The base includes applications reviewed in the current and prior two meetings. It also includes any applications reviewed by *ad hoc*, SEP or special study sections which have designated a parent study section in the prior rounds.

DRG Ad Hoc, SEP, and Special Study Sections with Parent Committee Designations.

Competing R, P, and U applications (excluding R13, R15, R43, R44, R55, U43, and U44 activities) reviewed by *ad hoc* and special study sections (SSS) where at least 30 percent of the members are currently serving on a chartered committee or have served within the last two years will be percentiled using the designated chartered study section's base or past round base if the current base has not been computed. In future rounds these applications will be included in the base for that chartered study section. If a research application is reviewed as a fellowship by an *ad hoc* study section and the parent committee designation is a fellowship committee the percentile will be based on the "Total DRG" table.

DRG Ad Hoc and Special Study Sections Without Parent Committee Designations (Excluding ARRA-ARRG Study Sections).

Competing R, P, and U applications (excluding R15, R43, R44, R55, U43, and U44 activities) reviewed by *ad hoc* and special study sections (SSS) that have not indicated a parent committee are percentiled against the "Total DRG" base. The base is comprised of all competing applications reviewed in the prior three council rounds by chartered DRG study sections meeting the qualification requirement in the immediate past round. Applications reviewed by DRG *ad hoc* or special study sections which have designated a parent committee in the prior three rounds are also included.

Applications Reviewed by AIDS-Related Research (ARRA-ARRG Study Sections) at Ad Hoc Meetings Without Parent

Committee Designations. Competing R, P, and U applications (excluding R13, R15, R43, R44, R55, U43, and U44) reviewed by ARRA-ARRG study sections at *ad hoc* meetings (or where the ARR study section is not deemed "qualified") are percentiled against a separate "AIDS Total Table". This table is constructed from all R, P, and U (excluding R13, R15, R43, R44, R55, U43, and U44) applications which have been reviewed by chartered ARR study sections in the prior three (3) council rounds and have met the qualification criteria in the past round.

Bases Used for Percentiling

DRG-Reviewed Fellowship Applications.

Competing fellowship (F) applications reviewed by chartered DRG study sections are percentiled using the same criteria and formula as the study sections reviewing research grants. Likewise, the fellowship applications reviewed at *ad hoc* meetings of DRG study sections are percentiled against a "Total Fellowship" table which is built using the same methodology as the "Total DRG" table. The option of percentiling an *ad hoc* meeting against a chartered study section is applicable for fellowship applications as it is for research grants. In cases where a fellowship application is reviewed by an *ad hoc* meeting of a non-fellowship study section and the parent committee is a non-fellowship committee the percentile will be derived from the "Total Fellowship" table.

Applications Reviewed by ARRA-ARRG Study Sections at Ad Hoc Meetings.

Competing R, P, and U applications (excluding R13, R15, R43, R44, R55, U43, and U44 activities) reviewed by ARRA - ARRG study sections at *ad hoc* meetings (or where the ARR study section is not deemed "qualified") are percentiled against a separate "AIDS Total Table". This table is constructed from all R, P, and U (excluding R13, R15, R43, R44, R55, U43, and U44) applications which have been reviewed by chartered ARR study sections in the prior three (3) council rounds and have met the qualification criteria in the past round.

NIH Institute/Center Reviewed Competing Applications (Excluding NCRR).

Competing R, P, and U applications (excluding R13, R15, R43, R44, R55, U43, and U44 activities) reviewed by an Institute or Center (other than NCI) initial review group are percentiled using the "Total DRG" table. Applications reviewed by NCI IRG's are not percentiled against the "Total DRG" table.

NCRR Reviewed Applications.

Competing R, P, U, and M01 applications (excluding R13, R15, R43, R44, R55, U43, and U44) reviewed by NCRR chartered committees are percentiled using the grant history for their committee as long as they have met the qualification requirements. If the committee has not reviewed 25 applications in the current and prior 2 rounds then the application is percentiled using the "Total DRG" table.

Bases Used for Percentiling

NIAAA, NIDA and NIMH Chartered Initial Review Groups.

Competing R, P, and U applications reviewed by chartered NIAAA, NIDA, and NIMH IRG's are percentiled using the same methodology as the DRG study sections with minor differences. The differences are: (1) applications submitted in response to an RFA are excluded from percentiling; and (2) R10 and R13 applications are excluded from the base for percentiling (they do, however, receive a percentile based on the institute "Total" table described below.

NIAAA, NIDA, and NIMH Special Review Committees and Non-Qualified Chartered IRG's.

A "Total" percentile table is constructed for each Institute. The "Total Table" is built from all R, P, and U applications (excluding R13, R15, R43, R44, R55, and all applications submitted in response to an RFA) that have been reviewed in the prior three council rounds by the institutes' chartered IRG's that are qualified in the immediately prior council cycle. Applications given *ad hoc* reviews (AHR's) which designate a parent committee in the prior three rounds are also included. All special reviews that are done (other than those meeting the 30% of current/former IRG members) use this table for assigning the percentile.

Agency for Health Care Policy and Research (AHCPR).

Competing R, P, and U applications (excluding R03 (if score is 000), R13, R15, R43, R44, R55, U43, and U44) are percentiled using the chartered committee's base of records for the current and prior two rounds. If a committee does not meet the "qualification" requirements, then it is percentiled against the "Total DRG" table.

Center for Substance Abuse Prevention (CSAP), SAMHSA.

Competing applications assigned to CSAP IRG's are percentiled by group code using only those applications reviewed in the current council cycle. Each meeting held by the Special Review Committee on Substance Abuse Prevention Conference Review Committee is percentiled on its own.

Minority-Targeted Grant Activities

G12 Research Center in Minority Institutions Award

To assist predominantly minority institutions that offer a doctorate in the health professions and/or health-related sciences to strengthen and augment their human and physical resources for the conduct of biomedical research.

K14 Minority School Faculty Development Awards

To encourage the development of faculty investigators at minority schools and to enhance their research capabilities in specified health and health-related areas.

S03 Minority High School Student Research Apprentice Program

To provide meaningful experience in various aspects of health-related research in the expectation that some apprentices will decide to pursue careers in biomedical research.

S06 Minority Biomedical Research Support (MBRS)

To strengthen the biomedical research and research training capability of minority institutions, and thus increase the involvement of minority faculty and students in biomedical research.

S11 Minority Biomedical Research Support (MBRS) Thematic Project Grants

To promote increased faculty and interdepartmental collaboration through programs that focus on specific research themes or scientific disciplines at developing minority institutions. These grants are intended to strengthen the biomedical research capability in defined areas and to attract other competent biomedical scientists by improving the research environment.

S14 Minority Biomedical Research Support (MBRS) Grant Program for Undergraduate Colleges

To enrich the research environment at eligible undergraduate institutions with the purposes of motivating students toward biomedical research careers, and providing faculty with opportunities to participate in biomedical research.

Minority-Targeted Grant Activities***F34 MARC NRSA Faculty Fellowships***

To provide fellowships to selected faculty members from minority institutions to enable them to obtain advanced training in specified health and health-related areas.

F36 MARC Visiting Scientists Fellowships

To strengthen research and teaching programs in the biomedical sciences for the benefit of students and faculty at minority institutions by drawing upon the special talents of scientists from other institutions.

T34 MARC Undergraduate NRSA Institutional Grants

To enable minority institutions to make to individuals selected by them, National Research Service Awards for undergraduate research training in the biomedical and behavioral sciences.

T36 MARC Ancillary Training Activities (Grant)

To increase the number of well-trained minority scientists in biomedical disciplines and to strengthen the research and teaching capabilities of minority institutions through a variety of training mechanisms such as visits by experienced scientists to minority institutions or workshops/conferences designed to enhance the research training experience of students/faculty from minority institutions.

Definitions of Selected Grant Activities

K01 Research Scientist Development Award -- Research & Training

For support of a scientist, committed to research, in need of both advanced research training and additional experience.

K04 Research Career Development Awards

To foster the development of young scientists with outstanding research potential for careers of independent research in the sciences related to health. This applies only when the application for the initial award was received after July 1, 1967.

P01 Research Program Projects

For the support of a broadly based, multidisciplinary, often long-term research program that has a specific major objective or a basic theme. A program project generally involves the organized efforts of relatively large groups, members of which are conducting research projects designed to elucidate the various aspects or components of this objective. Each research project is usually under the leadership of an established investigator. The grant can provide support for certain basic clinical components, the sharing of which facilitates the total research effort. A program project is directed toward a range of problems having a central research focus in contrast to the usually narrower thrust of the traditional research project. Each project supported through this mechanism should contribute or be directly related to the common theme of the total research effort; these scientifically meritorious projects should demonstrate an essential element of unity and interdependence; i.e., a system of research activities and projects directed toward a well-defined research program goal.

R01 Research Project (Traditional)

To support a discrete, specified, circumscribed project to be performed by the named investigator(s) in an area representing his specific interest and competencies.

R13 Conference

To support international or national meetings, conferences, and workshops.

R15 Academic Research Enhancement Awards (AREA)

To support small-scale research projects conducted by faculty in primarily baccalaureate-granting institutions. Awards are for up to \$100,000 for up to a 24-month period.

Definitions of Selected Grant Activities

R22 *U.S.-Japan Cooperative Medical Science Program*

To support research, for the benefit of the people of Asia, confined to six specifically limited medical problem areas: cholera, leprosy, malnutrition, the parasitic diseases schistosomiasis and filariasis, tuberculosis, and certain viral diseases (primarily rabies and dengue hemorrhagic fever). Program emphasis is upon medical research as the basis for advanced knowledge necessary for effective action.

R23 *New Investigator Research Awards*

To support basic and clinical studies so that newly trained investigators remain active during the developmental stages of their careers.

R29 *First Independent Research Support and Transition (FIRST) Awards*

To provide a sufficient initial period of research support for newly independent biomedical investigators to develop their research capabilities and demonstrate the merit of their research ideas.

R43 *Small Business Innovation Research Grants (SBIR) -- Phase I*

To support projects, limited in time and amount, to establish the technical merit and feasibility of research and development (R&D) ideas that may ultimately lead to a commercial product(s) or service(s).

R44 *Small Business Innovation Research Grants (SBIR) -- Phase II*

To support in-depth development of R&D ideas whose feasibility has been established in Phase I and are likely to result in commercial products or services.

S10 *Biomedical Research Support Shared Instrumentation Grants*

To make available to institutions with a high concentration of NIH extramural research awards, research instruments for shared use.

Other Publications of Interest

NIH PEER REVIEW NOTES

Information on DRG and Institute peer review policies and procedures published periodically (usually prior to scientific review meetings) for NIH consultants and staff.

DRG PEER REVIEW TRENDS: CHARACTERISTICS OF MEMBERS OF DRG STUDY SECTIONS, INSTITUTE REVIEW GROUPS, AND ADVISORY COUNCILS, 1981-1991

Charts and commentary describing 10-year trends in the characteristics of NIH peer reviewers.

NIH NEW GRANTS AND AWARDS

Quarterly list of new awards arranged by grant mechanism and by state, city, institution, and principal investigator; includes title, grant number, and dollars awarded. These data will be available through an electronic bulletin board. For information regarding their access, please contact Ms. Carolyn Stelle of the Data Management and Control Section, Information Systems Branch, Division of Research Grants, National Institutes of Health, Bethesda, Maryland 20892. She can be reached at 301/594-7015 (voice), 301/594-7058 (facsimile), or WUS@NIHCU.GOV (E-Mail).

NIH EXTRAMURAL TRENDS, FISCAL YEARS 1984-1993

Annual series of charts and commentary describing 10-year trends in NIH extramural awards; released annually.

WOMEN IN NIH EXTRAMURAL GRANT PROGRAMS, FY 84-93

Charts and commentary describing 10-year trends in NIH peer review and funding arranged by gender of applicant.

MINORITIES IN NIH EXTRAMURAL GRANT PROGRAMS, FY 82-91

Charts and commentary describing 10-year trends in NIH peer review and funding arranged by racial/ethnic group of applicant.

For other DRG publications such as program guidelines, grantsmanship articles and brochures, and publications explaining the NIH extramural programs, contact the Grants Information Office, Division of Research Grants, NIH, Westwood Building, Room 449, Bethesda, Maryland 20892 or telephone (301) 594-7248.

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